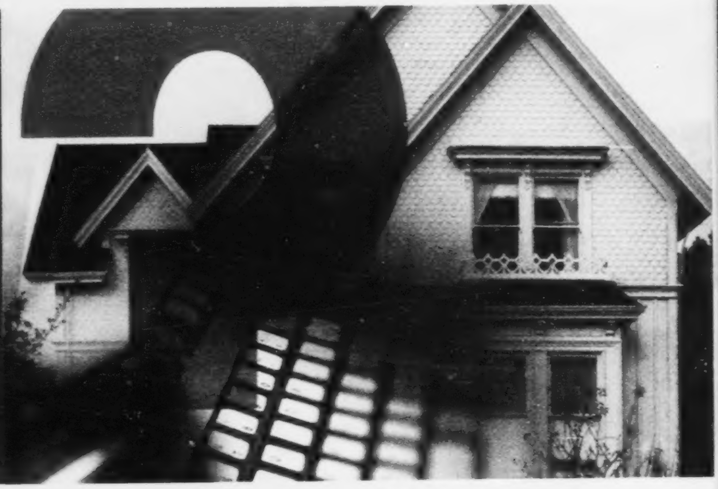
CURRENT HOUSING RESEARCH

VOLUME 10, NUMBER 2

WINTER 2003-2004

SOCIAL, ECONOMIC AND TECHNICAL RESEARCH



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CURRENT HOUSING RESEARCH

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Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***

CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or research highlights listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa ON K1A 0P7
Fax (613) 748-4069
Telephone 1-800-668-2642
Email: chic@cmhc-schl.gc.ca

COMPLETED REPORTS REQUESTED

☐ Send copies of above reports, research highlights

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INTRODUCTION

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

Current Housing Research is compiled and produced two times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at chic@cmhc-schl.gc.ca

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);

- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "Completed Report."

- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

CMHC's External Research Program

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and non-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made annually to support research investigations into important questions, problems, and issues affecting Canadian housing. CMHC is interested in receiving applications on topics related to existing CMHC housing research.

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or under-graduate level are not eligible to apply. Students may be hired to assist in conducting the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must apply as a private consultant, and the proposed research must not be part of, or interfere with his/her regular work. CMHC employees are not eligible to receive grants under this Program.

To obtain the Guidelines and Application Form (product #62964):

- visit our Web site at http://www.cmhc-schl.gc.ca;
- e-mail: erp@cmhc-schl.gc.ca; or
- call 1 800 668-2642.

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TECHNICAL RESEARCH

ABORIGINAL HOUSING: LOCAL DESIGN AND MATERIAL

This project responds to opinion that house designs found in Aboriginal communities are inappropriate and that perfectly good building materials exist on reserve but are never used. The project assumes that in fact there are a significant number of examples where off the shelf house designs have been adapted and where local material has been incorporated. The project will identify these examples, and document a selected number of them as case studies. The case studies will produce material suitable for dissemination. The general approach is:-- to build an inventory of past initiatives on increasing the Aboriginal relevance of housing design and on assessing the feasibility of using local materials;-- to select a range of examples from the inventory for case study analysis; and-- to draw conclusions along the lines of "lessons learned."

***CMHC Project Officer** : Phil Deacon* CIDN : N/A

Division : Policy and Research *Division* STATUS : Ongoing

AVAILABILITY : Product is not yet available

BUILDING COMMUNITIES: FIRST NATIONS BUILDING ENVIRONMENTALLY SUSTAINABLE HOUSING

This publication focuses on proven alternative construction methods, materials and techniques to achieve Healthy Housing and environmentally sustainable community development and economic development.. "Building Communities" outlines and explains new and efficient:

- Construction methods and materials;
- Cutting-edge technologies for electrical co-generation;
- Biological sewage and waste water treatment and purification systems;
- Alternative methods for heat generation;
- Innovative transportation systems for use in remote/fly-in communities.

"Building Communities" outlines the importance of planning to create an integrated approach to Healthy Housing and environmentally sustainable community development. It illustrates and explains some examples of Healthy Housing systems. It provides the principles that CMHC uses to guide and develop Healthy Housing, as well as the principles Onkwehonwene Anishnabek Sustainable Integrated Systems (OASIS) uses to achieve an integrated approach to environmentally sustainable community and economic development in First Nations. It provides updates on:

- The Eagle Lake Healthy House and micro-infrastructure;
- The Mohawk community of Tyendinaga, planned sustainable Healthy Housing subdivision;
- The Mohawk Community of Kahnawake, straw bale construction method and their planned sustainable community;
- Micro-infrastructures and self-contained utility development.

In addition, it uses as examples:

- The Pikangikum first Nation proposed 16-unit Healthy House project; and
- The Sheshegwaning First Nation Environmental Management Strategy.

Prepared by Morgan Green, Onkwehonwene Anishinabek Sustainable Integrated Systems. Ottawa: Canada Mortgage and Housing Corporation, c2002. 62 pages

Order number: 63063

Note : Aussi disponible en français sous le titre : Bâtissons ensemble : Les Premières nations construisent des logements respectueux de l'environnement

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

HEALTHY HOUSING BEST PRACTICE GUIDE FOR FIRST NATIONS BUILDER SERIES TRAINING COURSE

This project will develop a First Nations Healthy Housing (FNHH) Best Practice Guide. These practices will be included in a forthcoming revision of CMHC's Healthy Housing First Nations Builder Training Series course materials. The Guide will focus on water, wastewater, heat/power generation, appliances, envelopes, ventilation, and firefighting. Also included will be information on land-use planning, environmental inventories, community design (including housing clusters and other buildings), plus appropriate infrastructures including micro scale utilities. The revised training guide will be available by the end of 2003.

CMHC Project Officer : *Chris Ives*

CIDN : 26870200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

HOME SAFE HOME: THE COWICHAN RECLAMATION PROJECT

In the late 1990s, Cowichan Tribes, a first Nations community on Vancouver Island, was inundated with concerns over household mould and related health problems. Due to the extent and severity of the mould problem, many band members are or have become very sensitive to their environment and have developed a myriad of symptoms, the majority affecting the respiratory system.

In 2001, Cowichan Tribes, Indian and Northern Affairs Canada (INAC), the Canada Mortgage and Housing Corporation (CMHC), and Health Canada, along with Jacques Whitford Environment Ltd., banded together to confront this potential health crisis that affected virtually every family on the Cowichan Indian Reserve. To solve the problem and guard against future reoccurrence of the crisis, the partners embarked on possibly the most comprehensive residential mould study and abatement project ever attempted in North America.

This booklet describes the Cowichan mould crisis which affected the Cowichan community mentally, physically, emotionally, socially, and spiritually and outlines the steps taken by the Project Team members to resolve the situation. The wisdom gained in the Cowichan community is applicable for other First Nations and non-native communities across Canada. The housing construction and maintenance standards, abatement strategies, tenant agreements and training programs developed during the pilot project provide useful reference material for other communities facing a mould problem.

Ottawa: Canada Mortgage and Housing Corporation; Vancouver: Cowichan Tribes; Indian and Northern Affairs Canada, British Columbia Region, 2003. 32 pages

Note : Aussi disponible en français sous le titre : Maison propre, maison saine : Projet d'assainissement des habitations cowichan

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products and from the BC Region Public Enquiries line: 604-666-8695; Toll free: 1-800-665-9320

MECHANICAL PERFORMANCE OF THE PROOF-OF-CONCEPT COMBINED MECHANICAL UTILITIES CONTAINER PLACED IN THE EAGLE LAKE FIRST NATION HEALTHY HOUSE

This project's objective is to review and improve the mechanical/electrical/electronic performance of the 'Proof-of-Concept' combined mechanical utilities container placed in the Eagle Lake First Nation Healthy House in the summer of 2000. Over the last two years of operation the development / monitoring team noted several areas of potential improvement for the unit. The overall goal of the improvements is (a) to stabilize the operating pattern of the unit, (b) to reduce dependency on the PLC (Programmed Logic Controller) installed in the unit, and (c) to create an operating system which is easier to maintain. The DC generator has been replaced with an AC generator to allow for basic maintenance to be done by any personnel properly familiar with diesel generators in northern and remote environments. A report outlining the upgrades and equipment modifications, together with revised homeowner maintenance manuals, has been received and is currently being reviewed.

CMHC Project Officer : *Chris Ives* **CIDN** : 23510200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

SEABIRD FIRST NATIONS FLEX/HEALTHY HOUSING DEMONSTRATION

The Seabirds Island First Nation housing demonstration project, on the Lower Mainland of British Columbia, will provide a full scale prototype of Flexhouse/Healthy house models and will apply principles of sustainability and integrated design to the design and decision process. Beginning in mid 2003, the project will be open for public demonstration for two years and will provide a model for application in remote First Nation communities. The contractor will conduct architectural design consulting to design, build and commission seven houses that are affordable, easy to build, easy to change, easy to maintain and inexpensive to operate.

CMHC Project Officer : *Allan Dobie* **CIDN** : 26630200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

SUSTAINABLE COMMUNITY SITE PLAN, INFRASTRUCTURE PLAN AND HEALTHY HOUSE DESIGNS

The objective of this project is to develop a sustainable community site plan, infrastructure plan and healthy house designs for approximately thirty homes in cooperation with the community of Tyendinaga. The intention of this project is to demonstrate that when alternative infrastructure options, land use patterns and high performance homes are explored simultaneously as an integrated design solution that improvements can be made in all these categories without an overall price increase. The integrated participatory design process will include community workshops involving both the immediate community as well as the broader Ontario First Nations community and design professionals. The results of the workshops and the resulting community and house designs will be published in a report and the first healthy high performance home will be available for public viewing for a period of one year.

CMHC Project Officer : *Chris Ives* **CIDN** : 24080200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

FLANKING TRANSMISSION IN MULTI-FAMILY DWELLINGS: PHASE II

This report contains the results and analysis from a 33-month research project to examine flanking transmission in wood framed construction that might be used in multifamily dwellings. The project focus and construction details were decided by a Steering Committee formed from technical representatives from each of the project partners: CMHC, Forintek Canada Corporation, Marriott International, National Research Council Canada, Owens Corning, Trus Joist, and USG Corporation.

The primary concern of the project was the effect of using continuous structural elements that pass under a partition wall between two horizontally separated dwellings. Continuous structural elements such as subfloor sheathing, and/or joists, are often used in buildings that must withstand increased dynamic loading due to high winds or seismic velocities. However, these details often occur in single family dwellings so many of the results and recommendations in this report are applicable to situations where improved sound insulation is desired between rooms in the same dwelling.

The method of small perturbations, or changes, to a common construction involving a continuous structural element was used to assess the effect of various construction details on the airborne and impact sound insulation.

Prepared by T.R.T. Nightingale, R.E. Halliwell, and J. D. Quirt. CMHC Project Officer: Luis de Miguel. Ottawa: Institute for Research in Construction, National Research Council Canada, 2002.

STATUS : Completed Report

AVAILABILITY : On a loan basis from the Canadian Housing Information Centre

QUALIFICATION DU DEGRÉ DE CONFORT ACOUSTIQUE PROCURÉ PAR LES IMMEUBLES MULTILOGEMENTS : PHASE II

In the study entitled "Qualification du degré de confort acoustique procuré par les immeubles multilogements – Phase I" submitted to CMHC on July 10, 1996, MJM Acoustical Consultants Inc. proposed a method of monitoring and evaluating the insulation of noise produced by human activity, plumbing and the mechanical equipment of multi-family buildings intended to be sold as condominiums. This Phase II report describes the validation process used for the criteria that were proposed during Phase I, based on studies undertaken by CMHC between 1980 and 1996, and suggests a protocol for assessing the degree of acoustic comfort in a unit located in a multi-unit residential building.

Prepared by Michel Morin and Jean-Marie Guérin, MJM Acoustical Consultants Inc. CMHC Project Officer: Jacques Rousseau. Ottawa: Canada Mortgage and Housing Corporation, 2002 (CMHC External Research Program Report) 63 pages

Note: No. 03-116 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

BASEMENTS, FOUNDATIONS & CRAWLSPACES

CONSTRUCTION DETAILS FOR RETROFITTING BASEMENTS - WEB-BASED ADVICE FOR CONSUMERS AND BUILDERS

The object of this work is to use findings of various basement research projects for the creation of web-based advice for consumers and builders. The preliminary structure of this web tool was assembled through the fall of 2002. A consultant with web experience will be hired in 2003 to complete the data gathering and program the results into a web tool. The tool is expected to be available in 2004.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 20650200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

PRACTICAL MEASURES FOR THE PREVENTION OF BASEMENT FLOODING DUE TO MUNICIPAL SEWER SURCHARGE

This External Research Program (ERP) project is reviewing the frequency and means of basement flooding due to sewer surcharges. The survey of municipalities is complete. The consultants have also analyzed devices or measures to prevent sewer surcharge. The consultants have submitted a draft report describing the problem and the range of available solutions for householders and builders, and a final report will be available by the end of 2003.

CMHC Project Officer : Don Fugler — ***CIDN*** : 24370206

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

BUILDING CODES

DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES

Under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC), CMHC is contributing to a partnership of National Building Code stakeholders to develop transitional training material for the objective-based codes which will include pilot testing. Content will provide for training on the structure, and new information to be included in the 2005 objective-based code, on the evaluation of alternative solutions to be allowed under objective-based codes (for example, using sprinklers in lieu of fire separations), on assessment criteria to allow for transferability of alternatives and their impact on other code requirements, on preparation of knowledge tests, on development of an instructor's guide, and on pilot testing. As provincial, territorial and municipal code enforcement officials have the most comprehensive information requirements, material will be developed at their level and then adapted for other stakeholder groups to meet their needs. This multi-year project will develop according to the following schedule: Year 2002/03 - Training needs assessment, Year 2003/04 - Development of training material, Year 2004/05 - Pilot-testing and completion of training material. The training needs assessment phase commenced in the Fall of 2002 and is nearing completion. The development of training material will commence early in 2004.

CMHC Project Officer : *Darrel Smith* — ***CIDN*** : 27000200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Seminar/training is not yet available

BUILDING CODES

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. A new draft of the document should be available for re-balloting in early 2004.

CMHC Project Officer : *Don Fugler*   ***CIDN*** : 19710200
Division : Policy and Research Division   ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

BUILDING MATERIALS

CHARACTERISTICS OF EFFECTIVE WATERPROOF SEALERS FOR MASONRY

The objective of this project is to study the vapour permeability characteristics of effective sealers applied to masonry walls; the issue is not one of stopping water absorption/penetration into the masonry, since most sealer products are effective in this role, but of assessing how the sealers affect drying of the masonry. CMHC in partnership with Masonry Canada, is providing funds to the University of Waterloo to undertake this preliminary study. This phase of the project will investigate the performance of 5 sealer types on individual masonry units and small masonry panels. Computer modeling and parametric analysis will be undertaken to demonstrate the impact of insulation levels, driving rain exposure, water absorption, orientation, imperfect air barrier, etc., for five representative Canadian climate zones. The project is expected to be completed by the end of 2004.

CMHC Project Officer : *Silvio Plescia*   ***CIDN*** : 25610200
Division : Policy and Research Division   ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEFINING PERFORMANCE OF WATER RESISTIVE BARRIERS

Water Resistive Barriers (WRB), also known as sheathing membranes, fulfill many critical functions in the building envelope, but the means to evaluate their field performance has not been adequately developed. This is a pilot project that aims to define the key elements affecting performance of WRB in stucco systems with a view to pursuing the following objectives:

1. Develop adequate experimental characterization of likely WRB field performance.
2. Define WRB characteristics needed for input into advanced Heat Air and Moisture (HAM) models.
3. Examine probable long-term performance of WRB and in particular, study the effect of chemical leaching from stucco products and wood based materials.
4. Compare the results of wetting and drying predicted by advanced HAM models with experimental results.

It is expected that helping manufacturers and users of breather-type moisture barriers define the performance of such materials in both conventional and rainscreen walls will lead to better differentiation between applications of different WRB products as well as in development of new products. The External Moisture Control (EMC) Consortia, comprising Canada Mortgage and Housing Corporation, the Homeowner Protection Office, E.I. Dupont de Nemours Inc., Fortifiber Corporation, and HAL Industries funded this project. The study was being performed at Concordia University. The research is complete and the report and research highlight will be available by spring 2004.

CMHC Project Officer : *Silvio Plescia*

CIDN : 2490 0200001

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

INCOMPATIBLE BUILDING MATERIALS: A REPORT DOCUMENTING PREMATURE FAILURE IN RESIDENTIAL CONSTRUCTION RESULTING FROM MATERIAL INCOMPATIBILITY

The purpose of this project was to research and document building material incompatibility problems found in low-rise residential construction. Building material incompatibility situations were identified through a literature search as well as a survey of the home building industry. The research report includes 35 cases of incompatibility problems, citing generic examples of incompatible materials. Solutions for the problems were solicited from expert sources (e.g. manufacturers). This information is useful for builders and renovators to help them identify in advance potential incompatibility problems and solutions.

Prepared by: J.F. Burrows Consulting. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2003. (Housing Technology Series) 49 pages.

Order number: 63263

Note 1: Aussi disponible en français sous le titre : Matériaux de construction incompatibles

Note 2: No. 03-103 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : The research highlight and report are available in hard copy from CMHC Information Products as well as on CMHC's web site at http://www.cmhc.ca/publications/en/rh-pr/tech/03-103-e.html.

MATERIAL PROPERTIES OF STRAW LIGHT CLAY INFILL SYSTEMS

This External Research project will establish the material composition and properties of an alternative building product, Straw Light Clay (SLC) infill systems. Laboratory testing will demonstrate its suitability for use in Canadian climates. Evaluation samples have been cast. The test protocol has been reviewed and approved. Laboratory testing will take place by the end of 2003.

CMHC Project Officer : *Don Fugler*

CIDN : 25250208

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

SEISMIC PERFORMANCE OF RAINSCREEN STUCCO

As an integral phase of a larger "Earthquake 99 Project" (a project to develop practical cost-effective methods to substantially reduce heavy earthquake damage to residential wood-frame construction) Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and British Columbia Housing Management Commission contracted with the University of British Columbia and TBG Seismic Consultants to research the seismic performance of rainscreen stucco exterior cladding systems for residential wood-frame construction in B.C. The primary objective of this research is a comparative earthquake performance evaluation of rainscreen and non-rainscreen stucco systems. The secondary research objective is the development of refinements to the design of rainscreen stucco systems to improve performance when subjected to seismic loading. This comprehensive study includes an extensive test series to determine the strength of different stucco types, static cyclic tests of single wall specimens, the analytical modeling of wall systems with stucco, and the dynamic testing of a full-scale house incorporating a stucco wall system. Research has been completed and the research report is being reviewed. A Research Highlight is expected by the end of 2003.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24800200
STATUS : Ongoing

TEMPERATURE AND MOISTURE CONDITION OF WOOD STRUCTURAL MEMBERS EMBEDDED IN INTERIOR INSULATED SOLID MASONRY WALLS, MONITORING OF THE GROSH BUILDING, STRATFORD, ONTARIO

Two projects have been launched to monitor the temperature and moisture content of wood structural members (joists) embedded in interior insulated solid masonry walls. Houses with solid masonry walls in Kincardine, Ontario, and Wolsely, Saskatchewan that have been retrofitted with interior insulation have been fitted with the necessary instrumentation to monitor the moisture and temperature regimes in wood joists embedded in the masonry walls. Based on the monitoring, the long-term durability of the wooden members will be estimated. The outcome of these projects will be used in the formulation of guidelines for insulation retrofits in solid masonry and stone buildings. The projects will be completed by June 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24290200
STATUS : Ongoing

TESTING OF AIR BARRIER MEMBRANES IN WALL ASSEMBLIES

This project will design and conduct a testing program to ascertain the performance and risk of air barrier materials and assemblies using recent construction materials in actual assemblies. Specifically, the purpose of the research project is to determine the effect that exposure to sustained environmental conditions, wetting of the substrate, and material compatibility has upon the adhesion strength between air barrier materials and substrates.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25350200
STATUS : Ongoing

ARCHITECTURAL PRECAST CONCRETE WALLS: BEST PRACTICE GUIDE

This guide and accompanying CD-ROM is a fully illustrated summary of current information on architectural precast concrete and provides designers with an understanding of the product, recommended design details and site practices. The guide discusses the types of panels, their manufacture, transport and installation and basic design considerations. The user is then presented with the fundamentals of building envelope performance, as it pertains to precast panels, through to best practice assemblies, details and specifications.

Prepared by Morrison Hershfield Ltd. A joint venture of Canada Mortgage and Housing Corporation and Public Works Government Services Canada in collaboration with the Canadian Precast/Prestressed Concrete Institute. CMHC Project Officer: Luis de Miguel. Ottawa: Canada Mortgage and Housing Corporation, c2002. 115 pages + CD-ROM

Order number: 62984 **Price: $89.00 + GST and handling charges

Note: Aussi disponible en français sous le titre : Murs en béton architectural préfabriqué : Guide des règles de l'art

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

EVALUATION OF A NON-DESTRUCTIVE METHOD FOR MEASURING THE PRE-STRESS FORCE IN UNBONDED TENDONS IN EXISTING POST-TENSIONED CONCRETE BUILDING

The objective of this project is to evaluate the effectiveness of a technique, developed by Halsall and Associates Limited, Consulting Engineers, for in-situ measurement of force in unbonded post-tensioned tendons Unlike reinforced concrete structures which use reinforcing steel dispersed throughout the structure to carry loads, post-tensioned buildings use highly stressed, steel cables (coated with grease and inserted into plastic sheathing) strategically placed within the concrete slabs to resist the applied loads. The evaluation of post-tensioned buildings and the recommendation of appropriate remedial strategies have been hindered by a lack of diagnostic tools that can effectively assess the load levels in the cables themselves without destroying the cables. This project will identify the strengths and limitations of this technique. The completion date for this project is expected to be the end of March, 2004. The results of this evaluation will be made available to engineering practitioners specializing in the investigation and repair of concrete buildings and structures.

CMHC Project Officer : *Silvio Plescia*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 23940200

STATUS : Ongoing

STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This study was initiated to address concerns raised at a round-table discussion convened by Canada Mortgage and Housing Corporation to discuss concrete deterioration and repair issues for buildings. It was generally agreed that there is no consistent approach to concrete investigations and repairs and that the development of an assessment and repair protocol would be beneficial. In achieving a concrete repair protocol, the first step is to identify the state-of-the-art and the current practice for investigation, repair and monitoring strategies. State-of-the-Art is considered to be the highest level of technology in the field at this time and Current Practice is considered to be the procedures that are in general or prevalent use by most consultants. This project will research current assessment, monitoring and repair strategies for concrete repair employed by engineering consulting firms commonly involved in concrete investigation and restoration projects . Existing

CONCRETE

protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This project is expected to be completed by spring of 2004. The finding from this study will provide the basis for developing a Best Practice Guide for the Repair, Maintenance and Monitoring of Concrete Parking Structures in the Residential sector.

CMHC Project Officer : *Silvio Plescia*
CIDN : 1890 0200002
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CONTAMINATED LANDS

DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project includes contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments. Two of the three case studies are complete: a potential soil gas movement problem in a Vancouver high-rise and heavy metals moving from contaminated fill in Wells, BC. The contractors have looked for a third location for several years but have not been able to find a willing property owner. This research will be terminated and the reports from the first two sites published in 2003.

CMHC Project Officer : *Don Fugler*
CIDN : N/A
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

INVESTIGATION OF ACCELERATED DOMESTIC OIL TANK CORROSION

The majority of homes in Atlantic Canada use oil-burning equipment for home heating and generate hot water for domestic and heating purposes. Oil is stored in tanks, either outside or inside the house and each year, millions of dollars are spent in cleaning up spills from leaks associated with these oil storage tanks. Some tanks have been known to last 30 years in service without leaks; others failing within a few years of service. The research project will investigate the extent and causes of the corrosive elements and suggest ways to prevent corrosion of the tanks. This External Research project is examining the extent of interior corrosion of domestic oil tanks that have been in operation for various periods of time. In particular the study will build upon research carried out under a previous CMHC grant, wherein it was found that water/chloride contamination appeared to be the cause of tank corrosion. The project is expected to be completed by the end of 2003.

CMHC Project Officer : *Silvio Plescia*
CIDN : 25250207
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

BEST PRACTICE GUIDE - WINDOWS

In partnership with Natural Resources Canada and the Homeowner Protection Office, CMHC is developing this comprehensive and practical, technical advisory document for architects, engineers, builders, renovators, window manufacturers, window installers and others involved in the design, specification, construction, installation and interfacing of windows within the exterior wall assembly in both low-rise and high-rise residential construction. This document will guide the user in selecting the appropriate window performance criteria for the intended application and will provide installation details to ensure the performance criteria is achieved through the effective continuity of thermal, air, vapour and moisture barriers at the interface between the window units and the wall assembly. The project is expected to be completed by the end of 2004.

CMHC Project Officer : *Silvio Plescia* | ***CIDN*** : 3087-PLN03
Division : Policy and Research Division | ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available | ***NEW***

CONSTRUCTION OF SUPER 'E' HOMES - COMPARISON OF UK WINDOW STANDARDS TO CANADIAN STANDARDS

The purpose of this project is to work with the Institute for Research in Construction's Canadian Construction Materials Centre in Canada and BBA in the United Kingdom to test a representative sample of Canadian windows to accelerate the acceptance of Canadian windows in the United Kingdom.

CMHC Project Officer : *Terry Robinson* | ***CIDN*** : 18210900
Division : CMHC International | ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATING THE EFFECTIVENESS OF WALL-WINDOW INTERFACE DETAILS TO MANAGE RAINWATER

Based on the need for effective window-wall interface details to manage water intrusion, CMHC is proposing to develop and publish a Best Practices Guide for Window Installation that will be applicable to both low-rise wood frame construction and high-rise buildings. To support the development of the Guide, and the needs of the fenestration, wall cladding and flashing industry, CMHC in partnership with the National Research Council (NRC) is building a consortia of interested North American organizations to evaluate specific window-wall interface details to determine how effective they are in managing rainwater; CMHC and NRC are funding the first year of this 3-year intended study. The Phase I study will be completed by end of 2004 at which time the results will be made public.

CMHC Project Officer : *Silvio Plescia* | ***CIDN*** : 27080200
Division : Policy and Research Division | ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

LEAK-PROOFING WINDOWS, PHASE II - A REVIEW OF STANDARDS TESTING AND CERTIFICATION

Recent CMHC surveys including "The Survey of Building Envelope Failures in the Coastal Climate of British Columbia" and "Wall Moisture Problems in Alberta Dwellings" revealed that exterior moisture penetration through and/or around windows (at window wall interfaces) is a significant contributor to the envelope moisture problem. The objective of this research project, funded by Canada Mortgage and Housing Corporation in partnership with the Homeowner Protection Office and the British Columbia Housing Management Commission, will be to conduct a detailed review of the Canadian Window Standard CSA A440, together with all its attachments, to review the test requirements related to moisture penetration as outlined in the standards, and to review, assess and evaluate the window certification programs and processes. This research project will identify recommended solutions and opportunities for alleviating these moisture problems into the wall assembly from the window/wall interface. This study will complement a companion study "Leakproofing Windows, Phase I - Fabrication, Installation and Maintenance" in which the primary window leakage paths and causal factors are identified from insitu window-wall performance records.The CSA A440 Window Standards Committee is considering the adoption of and harmonizing with the North American Fenestration Standards (NAFS). This project will also attempt to consolidate the potential impact that NAFS may have on the performance of windows if adopted by the window standards committee. This research project has been completed. The Research Highlight will be completed by the end of 2003.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24250200
STATUS : Ongoing

WATER PENETRATION RESISTANCE OF WINDOWS: STUDY OF MANUFACTURING, BUILDING DESIGN, INSTALLATION AND MAINTENANCE FACTORS

The purpose of this study was to determine the primary leakage paths and causes of water penetration associated with windows and the window to wall interface. Accomplishment of this goal facilitated development of recommendations for various industry sectors in addressing water penetration issues. The study does not address other performance issues associated with windows such as condensation control, air tightness and structural adequacy.

A companion project to the current study addresses water penetration issues associated with windows in the context of codes, standards and certification processes. The results of that study are reported on separately in a report titled Water Penetration Resistance of Windows – Codes, Standards, Testing and Certification.

Windows were grouped into generic types based on base frame material and rain penetration control strategy so that a smaller number of window categories could be considered. Six primary leakage paths through or around windows were established. A comprehensive list of causal factors that may contribute to the various leakage paths was developed.

With this background established as context for the evaluation of windows and the window to wall interface, the assessment proceeded with input from various industry sectors; manufacturing, testing and certification, building & interface design and field review, installation, and maintenance and renewals. The evaluation began with the assessment of the likelihood of particular leakage paths occurring for each window type, and the level of consequential damage that may occur for each leakage path and window type. Each window type was also assessed for the likelihood that particular causal factors contribute to a leakage path. Finally, the potential impact that industry sectors can have in addressing the causal factors was assessed.

The results of the study indicate that the dominant leakage paths of concern are those associated with the window to wall interface, both through the window assembly to the adjacent wall assembly and through the window to wall interface with the adjacent wall assembly. Consistent with this finding, it was noted that the A440 B rating performance criteria for water penetration control does not identify leakage associated with these leakage paths, nor is there a requirement for testing of the installed window assembly. A wide range of causal factors were found to contribute to leakage activity.

A key study finding was the fact that the selection of windows and the design of the window to wall interface failed to consider localized exposure conditions such as overhang protection provided by building features, or the local topography. The Manufacturing sector and Building & Interface Design and Field Review sectors have the most significant opportunities to impact positively on the performance of windows and the window to wall interface.

The key recommendations include the assessment of micro exposure conditions in the specification and selection of windows, as well as in the design of the window to wall interface. In general, all sectors need to have a greater focus on the installed window and associated details. One of the key components of this focus is the provision of some redundancy in water penetration control through the installation sub-sill drainage. A water penetration testing protocol needs to be developed and mandated for the installed window assembly.

Prepared by RDH Building Engineering Limited. Principal investigator: David R. Ricketts. Sponsors: Canada Mortgage and Housing Corporation, Homeowner Protection Office, Vancouver, B.C., and British Columbia Housing Management Commission. CMHC Project Officer: Silvio Plescia. Ottawa: CMHC, 2003. 1 CD-ROM

STATUS : Completed CD-ROM
AVAILABILITY : Canadian Housing Information Centre

WINDOW INSTALLATION COURSE - DEVELOPMENT AND DELIVERY

The objective of this project will be to develop a 'Window Installation' course. The course will be directed at those trades, or trades persons, charged with the installation of windows. The course will cover window installation in both low-rise and high-rise construction assemblies. The course will introduce to the installer the fundamental building science concepts required to integrate window and envelope performance criteria.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30700200
STATUS : Ongoing
NEW

ENERGY CONSERVATION

AIR LEAKAGE CONTROL DEMONSTRATION PROJECT (PERD)

A research project will be undertaken to assess the individual and collective impact of air sealing measures on building envelope air leakage characteristics, building energy consumption, indoor air quality and occupant comfort in multi-unit residential buildings. Air sealing products and measures will be documented for common air leakage points. The predictive capabilities of existing air leakage models will be assessed by comparing their estimates of annual energy savings with that actually achieved in practice. This project will be completed by March 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 3041-PLN03
STATUS : Planned
NEW

ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

An energy and greenhouse gas emission simulator will be developed to model the impacts of energy efficiency measures on large buildings. The energy simulator will be capable of analyzing the impact of individual, or packages of, energy efficiency measures on the energy consumption and green house gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and green house gas emission reductions will be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The results of the analysis will then be projected to national levels to determine the extent of retrofit measures that are required within the building stock to meet the reduction targets set by the Kyoto Protocol. The project will be completed by March 2004.

CMHC Project Officer : *Duncan Hill*

CIDN : 22490200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

CASE STUDIES OF MAJOR HOME ENERGY RETROFITS: FINAL REPORT

To meet targets for greenhouse gas production in Canada, the residential sector will have to significantly reduce energy consumption in existing houses. A 1995 CMHC report suggested that houses built prior to 1989 will have to reduce energy consumption on average by about 40%. This is a big reduction, one that is rarely realized in programs funded by government or the utilities. The object of this CMHC PERD (Program for Energy Research and Development) research, is to see whether relatively normal houses can have their total energy usage reduced by 40%. Saskatchewan Research Council were hired to determine this. Five houses were selected and the energy retrofits were completed by December 2001. Monitoring through 2002 established that the 40% goal could be achieved, but by only one of the five houses. The other four houses had energy reductions of 24 to 31%. The report discusses which retrofits were particularly successful and why most houses failed to meet the 40% goal. The rate of return on the retrofit costs borne by the homeowners was about 9%.

Prepared by Robert S. Dumont, Tom J.L. MacDermott, Jerry T. Makohon, Larry S. Snodgrass, Building Performance Section, Manufacturing/Value-Added Processing, Saskatchewan Research Council. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003.

Note: No. 03-115 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW

CMHC, in cooperation with Natural Resources Canada, conducted a literature review of energy and water end-use load profiles, interior heat gain, monitoring and analysis methodologies in residential buildings. The project identified what data is available on energy and water end uses, research projects, data, monitoring protocols and published information relating to energy and water load profiles of housing. The study concluded that consistent, accurate and detailed load profiling data is not available for all end-uses in dwellings, particularly multi-unit residential buildings. CMHC and NRCan plan to develop a load monitoring protocol that will be used to gather data in both single family and multi-unit residential buildings in a consistent and systematic manner. Upon completion of the protocol, load monitoring projects will be conducted in dwellings across Canada.

The results of the load profiling literature search will be made available in a CMHC research highlight by December 2003.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 22010200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CMHC ENERGY EFFICIENCY CASE STUDIES MOLE HILL COMMUNITY GROUND SOURCE HEAT PUMP CONVERSION PROJECT

A project has been initiated to document, as an energy efficiency case study, the conversion of the dwellings of the Mole Hill Community to ground source heat pump systems. The project will describe the situation that led to the decision for the conversion, the design, installation and commissioning, and the post installation performance of the systems. The annual energy use of the project, before and after the conversion and any resultant cost savings will also be identified. The project will be completed by December 2003.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 18990200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

COMPARISON OF MODELED AND MONITORED PERFORMANCE OF A WALL INSULATION RETROFIT IN A SOLID MASONRY BUILDING

In 1997, CMHC was involved in the renovation of a building with solid masonry walls. Part of the renovation involved the addition of insulation to the interior of the solid masonry walls. This retrofit technique is contentious within the construction industry as it is thought to cause wall durability problems due to freeze thaw cycles, interstitial condensation and thermally induced stresses. Monitoring of the project shows that the wall systems are thus far performing well. CMHC engaged a consultant to use a hygrothermal modelling tool to assess the degree to which the tool can track the wall performance monitoring conducted to date and to assess the long-term performance of the retrofitted wall system. The project found that modelling tools can be set up to provide comparable output results of the conditions actually monitored in the wall assemblies. However, the success of such an effort is highly dependent upon the knowledge of the modeller, the availability of information on material properties and knowledge of the working boundary conditions. The research concluded that once the modelling is reconciled with the monitoring data, the model can then be used to evaluate the impact of variables such as the use of different systems, climate, geographical location, etc. on the performance of the retrofitted wall assembly. The project also made several recommendations with respect to monitoring and modelling procedures that should be used to improve the overall quality of the evaluation.

Prepared by John Straube and Chris Schumacher. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2003. 52 pages

Note: No. 03-111 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

COMPARISON OF THE US ENERGY STAR PROGRAM WITH CANADIAN ENERGY REGULATIONS

Energy Star is a certification program in the US that promotes energy-efficient products and homes. The project will compare the requirements of the Energy Star with Canadian existing practices, such as R-2000, the Model Energy Code and provincial building codes. This will allow CMHC to know if Canadian standards meet or exceed Energy Star. The study will also propose how to link the Canadian standards with Energy Star. The study will provide a first step towards a certification of Canadian building systems according to Energy Star.

CMHC Project Officer : *Sanjar Farzaneh* ***CIDN*** : N/A
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEMONSTRATION OF BUILDING INTEGRATED PHOTOVOLTAIC POWER

This research undertook three Building Integrated Photovoltaic (BIPV) demonstration projects: (1) a modular house that produces electricity - Home 2000; (2) A Ventilated Photovoltaic Façade; (3) Grid Connected BIPV. These demonstrations by the BC Institute of Technology have shown the professional housing community how photovoltaic panels can be integrated into buildings on a wide range of exterior surfaces including roofs and facades. A final report is being reviewed.

CMHC Project Officer : *Chris Ives* ***CIDN*** : 23190200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

DESIGN SURVEY OF LOW ENVIRONMENTAL IMPACT HOUSING

This research project will provide a documentation of the best existing examples of low/zero net energy housing forms to date in Canada and internationally in similar climates. The project is supported through the PERD (Panel for Energy Research and Development) program. The goal is to eventually establish criteria and specifications for zero environmental impact housing in Canada, develop best practice models towards achieving this goal, and ultimately demonstrate these "deep green" housing models for Canadian climatic regions. The completed research report is expected in 2004.

CMHC Project Officer : *Thomas Green* ***CIDN*** : 25400200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFICIENCY AND RETROFIT IMPLICATIONS OF BUILDING RECOMISSIONING SURVEY - CONTRIBUTION

CMHC, in cooperation with Natural Resources Canada, conducted a literature survey of the availability of recommissioning guidelines and other "tune-up" procedures for multi-unit residential buildings. The survey found that there was no single source of published information for enhancing the performance of multi-unit residential buildings via low and no-cost measures. Information was found to be available for individual measures to improve space heating, domestic hot water, lighting and appliances, building envelope and ventilation systems. Given the absence of recommissioning, or tune-up, guidelines for multi-unit residential buildings but the availability of information for discrete building systems from a wide variety of sources, the project concluded that CMHC should initiate a subsequent project to compile the measures into a single Tune-Up Guide for Multi-Unit Residential buildings. The project is complete. A Research and Development Highlight detailing the findings of the literature search will be published in December 2003.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 23590200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing. The case studies currently underway include:

1. Conservation Co-op, Ottawa;
2. Dual Fuel Heating System, Oshawa;
3. Energy Efficiency Retrofit of an Apartment Building, Toronto;
4. Case Studies of Interior Insulation Retrofits in Buildings with Solid Masonry Walls (CMHC "A" Building, Ottawa; Lofts Corticelli, Montréal; Karcher Building, Prince Albert);
5. The Complete Rehabilitation of the Broadview Apartment building.

The case studies will be published as a part of the CMHC Better Building Series by December 2003.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 18990200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), has developed a manual that details energy and water efficiency measures for existing multi-unit residential buildings. The document is based on a manual originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual offers proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. Individual energy and water efficiency measures have been placed on the high-rise website as the energy and water efficiency "Tip of the Week". The final publication of the user guide and compilation of individual measures is under external review. The planned release date for the manual is January 2004.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 18870200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is available on the web

EXPERIENCE OF EARLY ADOPTERS OF SMALL-SCALE, GRID-CONNECTED RENEWABLE ENERGY SOURCE POWER PRODUCTION AND NET METERING POLICIES IN CANADA

This study has investigated the experience of early adopters of small-scale, renewable energy source grid-connected independent power producers (IPPs). This includes a compilation and an overview of net metering policies across Canada. The work incorporates aspects relevant to the post 14 August 2003 electrical blackout in Ontario. The final draft report is being reviewed and a Research Highlight will be prepared.

CMHC Project Officer : *Chris Ives*
CIDN : 25250206
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

FINANCIAL MEASURES WHICH HAVE BEEN USED TO REDUCE GREENHOUSE GASES AND IMPROVE ENERGY EFFICIENCY IN RESIDENTIAL HOUSING

The objective of this research is to identify a range of financial mechanisms that have been used in Canada and the US to facilitate the adoption of energy efficiency measures in new and existing housing and to provide a brief description of them together with related follow-up contact reference information. The thumbnail sketches are to be supplemented with a more in depth examination of a number of these measures. The research is to be set within the context of the Canadian housing potential for reduction in energy use from the current level and with respect to its likely contribution to the Kyoto objectives.

CMHC Project Officer : *Fanis Grammenos*
CIDN : N/A
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

MEASURING HOUSING SUSTAINABILITY - ANNEX 31 - ENERGY RELATED ENVIRONMENTAL IMPACT OF BUILDINGS

Annex 31 is a project established under the auspices of the International Energy Agency's (IEA) Agreement on Energy Conservation in Buildings and Community Systems, for which CMHC is the designated Operating Agent (project manager). The mandate for the Annex 31 project is to provide information on how tools and assessment methods might improve the energy-related impact of buildings on interior, local and global environments. The ultimate objective is to promote energy efficiency by increasing the use of appropriate tools by practitioners. Through collaborative research and communications by 14 participating countries, the goal of Annex 31 is to advance the capability and reduce the cost of estimating the energy related environmental effects of buildings, and to increase awareness of the importance of including such estimation in the design process. The end product for the project will be a final Annex 31 report, web-site and CD-ROM available in early 2004. The project scope includes a description of tool theory and methods, a directory of tools, case studies, and research reports on how tools perform. The Annex 31 report may be of interest to users of tools, to groups engaged in tool design, and to anyone establishing policy and guidelines for promoting better decision-making within the building sector.

CMHC Project Officer : *Thomas Green*
CIDN : 16290300
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

MONITORING THE PERFORMANCE OF A HIGH-RISE RESIDENTIAL BUILDING RETROFIT: IMPACT ON ENERGY CONSUMPTION

In 1997, CMHC monitored the performance of a high-rise residential wall assembly that was retrofitted with an exterior insulated finish system. The monitoring showed that the retrofit enhanced the performance of the wall by increasing thermal insulation levels, reducing air leakage and preventing moisture penetration. The impact of the retrofit work on energy consumption was also studied. The study found that the building was a high energy user (in excess of 550 ekWh/m2) prior to the retrofit. The retrofit work resulted in energy savings of $18,720 per year. Energy savings were not as high as expected but it is suspected that this was due to the installation of a parking garage heating system and a new corridor air ventilation system. However, the post construction building energy use was reduced to 216 ekWh/m2. It was found that the energy savings associated with the added wall insulation provided an overly long payback given the incremental costs of the insulation system. The report will be published as an energy efficiency case study by December 2003.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 16020200
STATUS : Ongoing

OPTIMIZING HEAT AND AIR DISTRIBUTION SYSTEMS WHEN RETROFITTING HOUSES FOR ENERGY EFFICIENCY

When a house undergoes energy upgrading, either by improving the envelope or the heating appliance, one factor often overlooked is the heating or ventilating distribution system. With support from the Program for Energy Research and Development (PERD), CMHC is undertaking research into distribution system upgrades. The first stage of this work was a review of the performance characteristics of current and innovative distribution systems. The review established the operating characteristics of HVAC equipment and distribution systems, and the limitations of retrofitting existing heating systems. Three small projects evolved from the preliminary review. Contractors looked at simplified furnace sizing calculations, the difference in heating system installation between a city with diligent inspection and one where inspection is minimal, and a demonstration of how to install forced air ducting in houses with no existing air distribution systems. The retrofit furnace sizing project showed that furnaces can be sized quite accurately using billing data. The project is complete and published, and the sizing procedure is described in a Research Highlight and an About Your House document. The report on the effects of municipal requirements on HVAC system design was less conclusive. A relatively small sample size and a similar lack of inspection in both municipalities prevented the study from showing a clear advantage of municipal requirements and enforcement. The report has been published and a Research Highlight will be out in fall 2003. The third study on retrofitting ducting in existing houses has experienced delays. The field work will be finished in fall of 2003 and a report will follow in the winter of 2003/2004.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 24400200
STATUS : Ongoing

RETROFIT MEASURES TO REDUCE, GENERATE OR RECOVER ENERGY AT THE BUILDING ENVELOPE OF MULTI-UNIT RESIDENTIAL BUILDINGS

A research project was initiated to evaluate the opportunities to recover, generate and reduce energy use at the building envelope of multi-unit residential buildings. A survey of technologies used to generate, reduce and recover energy in multi-unit residential buildings was undertaken to identify approaches that may be applicable in existing Canadian multi-unit buildings. The project consultant organized a technology cost-benefit screening session with a property manager-owner and building design consultants. It was determined that many of the emerging technologies were far too expensive or risky for property owners. The most promising systems were found to be solar wall, for preheating ventilation air and enclosing balconies. While the economics of the solar wall technology was justifiable in terms of energy cost savings, enclosing balconies only made sense if it were done to realize other, non-energy related, benefits. A project report and Research Highlight will be available in December 2003.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 24030200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SHORT CONSUMER PIECES ON ENERGY SAVINGS IN SPECIFIC HOUSING STYLES

This research will produce a series of short consumer information pieces describing options for improving the energy savings in older houses, targeted at specific house design types. CMHC has three longer publications available or pending that are specific to a single house type. This CMHC PERD (Program for Energy Research and Development) initiative will provide the same design-based advice to renovators and homeowners, but in a shorter format, with the most effective energy retrofits prioritized for each housing style. Draft reports have been submitted to CMHC and are currently undergoing review. The review process is extensive. Final products are not expected until early 2004.

CMHC Project Officer : *Don Fugler* ***CIDN*** : 25420200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

STRATEGIES FOR ALTERNATIVE ENERGY USE AND REDISTRIBUTION AT THE BUILDING ENVELOPE

As part of a three year PERD initiative, integrated consultant teams explored the potential strategies to reduce, generate or recover and redistribute energy at the building envelope of multi-unit residential buildings for Prairie, Vancouver, Toronto and Halifax locations. The teams included expertise in building management, and development, as well as architectural, engineering and energy simulation. Each team developed recommendations for the strategies most feasible in their study areas. In Montreal a charrette led by NRCan explored sustainable strategies for a mixed-use project which includes retrofit and new commercial and residential development. The findings of the Prairie team have been used to develop strategies for a housing development in Regina. The Montreal project on which the charrette was based is moving forward.

CMHC Project Officer : *Sandra Marshall* ***CIDN*** : 08400306
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY CONSERVATION

SUPPORT FOR IEA ANNEX 39 : HIGH PERFORMANCE THERMAL INSULATION SYSTEMS

The International Energy Agency has launched an R&D program to research high performance thermal insulation systems for buildings. The project will focus on vacuum insulation panels that can achieve, in theory, an insulating value of R75 per inch. Vacuum panels represent an order of magnitude improvement over conventional insulating materials, thus the energy saving potential for both new and existing buildings is enormous. Plans are being developed to organize and run a demonstration project using vacuum panels in order to assess their application and performance in buildings. CMHC will be supporting Canada's contribution to the IEA project, led by NRC's Institute for Research in Construction, and will be able to disseminate the results to the housing industry. Canada has also been asked to participate in the development of an International Standard for Vacuum insulating panels as a part of the IEA effort. The project is currently underway and will be completed by January 2006.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30450200
STATUS : Ongoing

FIRES & FIRE PREVENTION

CANADIAN HOUSING FIRE STATISTICS

This project's purpose is:
1. to provide Canadian statistical benchmarks for fire safety in housing, including Aboriginal housing; and
2. to provide recommendations for Canadian housing fire loss and cost data that should be collected. The consultant is completing final revisions to the report.

CMHC Project Officer : *Mark Holzman*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 25250210
STATUS : Ongoing

CLEANING UP YOUR HOUSE AFTER A FIRE

After a Fire is a CMHC consumer publication being prepared to help homeowners deal with fire damage in their homes. This publication will explain the issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies. The document should be available late in 2003.

CMHC Project Officer : *Ken Ruest*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 2298 0200001
STATUS : Ongoing

AIR MOVEMENT IN MULTI-UNIT RESIDENTIAL BUILDINGS

This project will evaluate the pressure differentials across interior and exterior partitions of multi-unit residential buildings under different environmental conditions. It will also assess the performance of apartment bathroom and kitchen fans as well as apartment clothes dryers. Combustion air ducts serving apartment-based fuel-fired equipment will also be tested in terms of direction and magnitude of flow. This project will serve to illustrate how air moves through partitions and air handling systems in apartment buildings under varying indoor-outdoor conditions. The project will be completed in December 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 3052-PLN03
STATUS : Planned
NEW

ANALYTICAL MODEL OF EARTH TUBE VENTILATION SYSTEMS

The objective of this External Research Program project is to determine the conditions under which exterior ground-buried ducts (earth tubes) can be used effectively in Canada. The work will determine heat and moisture gains and losses for these systems under Canadian conditions and their potential contribution to improvement of energy and ventilation performance of Canadian housing. Guidelines will be developed for industry in the application of these systems. An interim report is being reviewed. Completion is expected early in 2004.

CMHC Project Officer : *Chris Ives*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 24370213
STATUS : Ongoing

CAN/CSA F326-M91 (R1998), RESIDENTIAL MECHANICAL VENTILATION SYSTEMS

CMHC has been supporting the revision of Can/CSA F326-M91 (1998), Residential Mechanical Ventilation Systems, with a financial contribution for the Canadian Standards Association (CSA) to act as secretariat, through separate contracts to consultants researching various aspects of the standard, and through CMHC participation in the task group work of the Committee. Significant changes to the standard are likely. The technical review is in progress and should be complete by early 2004.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 20620200
STATUS : Ongoing

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project is to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, will monitor indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance will also be assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, will be used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings. A report documenting the results of the project will be available by December 2003.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 19340200
STATUS : Ongoing

CHARACTERIZE THE PERFORMANCE OF A WATER LOOP HEAT PUMP SYSTEM IN A MULTI-UNIT RESIDENTIAL BUILDING

Two-pipe water loop heat pump systems represent an innovative approach to heating and cooling multi-unit residential buildings. The system consists of a central water distribution system that distributes moderately warm water to each apartment in the winter and cool water in the summer. An in-suite heat pump fan coil unit is then used to heat or cool the apartment depending on the season using the central water loop as a heat source or a heat dump. In theory, the system will allow for simultaneous heating and cooling of different areas of the building by redistributing heat to where it is needed. This ability is thought to offer significant energy savings but the extent to which this may be the case has not been evaluated. CMHC is undertaking a project to characterize the performance of a water loop heat pump system in a multi-unit residential building in Ottawa so that the potential for energy savings can be assessed. The project will evaluate energy consumption, and operational and maintenance issues over a one-year period. The project will be completed by January 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 18990200
STATUS : Ongoing

COMPARISON OF CENTRAL AND IN-SUITE SPACE / DOMESTIC HOT WATER HEATING SYSTEMS FOR MULTI-UNIT RESIDENTIAL BUILDINGS

A project has been initiated to survey the operation and maintenance performance of in-suite space and domestic hot water heating systems in multi-unit residential buildings. There has been little research conducted on the performance of in-suite systems as they are a relatively new approach to meet the space conditioning and water heating needs of apartment buildings. Nine buildings will be surveyed to establish system type, annual operating and maintenance costs, capital costs, architectural considerations, owner and occupant satisfaction with system performance and other parameters. The objective of the project is to provide insight regarding how well in-suite space and domestic hot water systems meet the needs of building owners and occupants. The project is also expected to identify any additional research that may be required to assess, or improve, the performance of in-suite systems. The project will be completed by December 2003.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing

CONSERVATION CO-OP – CORRIDOR OVERHEATING REMEDIATION STUDY

The Conservation Co-op is an innovative multi-unit residential building that has adopted many advanced, or green, building practices in the design, construction and operation of the building. One of the features of the building is the use of passive cooling and solar shading to maintain comfortable summertime conditions in the building. Unfortunately, hot and humid conditions in the summer creates highly uncomfortable temperatures in the corridors and apartments of the building. Preliminary indications are that the heat recovery ventilation system for the building does not adequately ventilate the common spaces and may even contribute to overheating by delivering hot humid outdoor air to the building. A project has been launched to assess the ability of a temperature and humidity controlled auxiliary cross ventilation system in the corridors to improve conditions. Similarly, the rooftop HRV systems that supply air to the corridors and apartments will be investigated to determine if the supply air function can be deactivated when outdoor air conditions are too hot and humid, and activated to take advantage of cooler outdoor conditions. The project will aid in the assessment of strategies to use night-time cooling to help maintain improved indoor conditions in multi-unit residential buildings without mechanical air-conditioning equipment. The project monitoring will be conducted from the fall of 2003 through the summer of 2004 and reporting will be completed by December 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22710200
STATUS : Ongoing

DAWSON CITY DEMONSTRATION PROJECT - MONITORING

The objective of this project was to evaluate the state of the mechanical and monitoring system, conduct an on-site inspection in Dawson City, develop a proposal for monitoring and analyzing the system's performance and monitor the two houses over several heating seasons. Additional monitoring was required due to unusual heating seasons and the operating data is now being analyzed. The monitoring results have been analyzed and a research highlight has been prepared.

Note: No. 03-113 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

CMHC Project Officer : *Mark Holzman*
Division : Policy and Research Division
AVAILABILITY : Research highlight is available

CIDN : 16760300
STATUS : Ongoing

DISTRIBUTION RETROFIT: PROPER RETROFIT FURNACE SIZING

The Building Performance Section of the Saskatchewan Research Council (SRC) was contracted by Canada Mortgage and Housing Corporation (CMHC) to examine simple methods for determining the required retrofit furnace size for Canadian residences.

This project was intended to test simple procedures for furnace sizing in retrofit situations and quantify the advantages of proper furnace sizing when replacing heating systems.

During the course of this project the SRC found twenty-six residences willing to participate in the project. Ten of these homes had actual meter readings for the month of January in at least one year, while all twenty-six homes had long term utility records.

Three methods of determining the required retrofit furnace size were employed during this project. The most detailed of the three methods consisted of plotting the natural gas consumption per day versus the heating degree days per day for the same period. In all cases this provided a linear relationship. By extrapolating this linear relationship out to fifty three heating degree days per day (corresponding to the 2.5% design temperature for Saskatoon (-35oC)), the peak heat loss of the home could be determined. The other two methods also determined the peak heat loss using a linear relationship of the natural gas consumption per day versus the heating degree days per day but only used two meter readings. The second method used the meter readings taken by the utility company every three months, while the third method used meter readings that were taken at the start and end of January.

When estimating the predicted retrofit furnace sizes the peak heat loss for each home (found using each of the methods) was increased by forty percent (the maximum suggested by F280). All of the homes were still dramatically over sized (from 1.22 to 3.86 times larger than forty percent over peak heat loss).

Modelling of the effects of furnace over sizing using the HOT2000 residential modelling software package indicated that there are no energy costs or savings associated with over sizing of mid- and high-efficiency furnaces. This does not agree with some of the information that is published. In fact the published information about mid- and high-efficiency furnaces almost always indicates that proper furnace sizing will reduce the energy consumption of the heating system. There are also publications that indicate high-efficiency (condensing) furnaces operate better if they are oversized and have shorter run times.

Prepared by Tom MacDermott, Rob Dumont, Jerry Makohon, Saskatchewan Research Council. CMHC Project Officer: Don Fuger. Ottawa: Canada Mortgage and Housing Corporation, 2003. 20 pages

Note: No. 03-109 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

EVALUATION OF AN APARTMENT HEAT RECOVERY VENTILATION SYSTEM

An innovative heat recovery ventilation system has been developed and installed in an apartment building. The system is based on the use of low wattage fans, heat recovery and a simple air distribution system to meet the ventilation needs of individual apartments. The system will be evaluated in terms of airflow, noise, occupant perceptions of indoor air quality, and operation and maintenance requirements. This project will help to identify better approaches to ventilating multi-unit residential buildings. The project will be completed by summer 2003 and a Research Highlight on the project will be available in December 2003.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 22710200
STATUS : Ongoing

FIELD TRIALS OF THE EKOCOMFORT PRODUCTS

CMHC is evaluating the performance of a new residential HVAC system that combines space heating, domestic hot water and ventilation into one integrated unit. Initiated under the trade name eKOCOMFORT, each of the systems developed by several independent Canadian manufacturers will be tested in homes in different regions of the country. By carrying out a detailed monitoring of the performance of each of the manufacturers eKOCOMFORT units, the project is designed to assist each manufacturer in refining their products. The project will assess the ease or difficulty of installing and commissioning the units in a variety of residential situations, information designed to assist manufacturers to refine and improve product installation. In addition, audits carried out on eKOCOMFORT units of each manufacturer will collect and evaluate homeowner/user data on maintenance, operating cost, noise levels and customer satisfaction. To be completed in July 2004, the project report will be available late 2004.

CMHC Project Officer : *William Semple*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 27820200
STATUS : Ongoing

IMPACT OF REQUIRING RESIDENTIAL HVAC SYSTEM DESIGN SUBMITTAL ON SYSTEM PERFORMANCE

In Canada, there are variations in the methods that authorities use to ensure that heating, ventilating and air conditioning systems are designed and installed properly in new residences. In particular, some authorities require submission of heat loss/gain calculations and duct designs prior to issuing building permits, while others do not. Also, some jurisdictions have more stringent inspection procedures in place than others. The purpose of this study is to compare the installed HVAC systems resulting from two different permit and inspection processes in two different cities in Canada.

City A: Requires the submission of heat loss calculations and duct sizes.
City B: Does not require the submission of heat loss calculations and duct sizes.

Significant deviations from code requirements were identified in each city. One could argue that the more rigorous inspection procedure in City B in part made up for the less stringent approval process. However, the study shows that City A does not necessarily enforce its own permit requirements and that the building inspection process in both cities missed flaws in some installations. The design requirements in City A appear to result in larger installed main ducts than in City B. Despite the inability of builders, contractors and inspectors to ensure code compliance, homeowners had few complaints about the quality of their installations. From the limited number of houses that were included in this study, it appears that there is little difference in the performance and perceived comfort levels of installed HVAC systems in the two cities with the current permit and inspection processes in place.

Prepared by William Crist, Sol-Tech Housing, Calgary, Ltd. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. Ottawa: CMHC, 2003. 22 pages.

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

INVESTIGATION OF A GROUND-SOURCE HEAT PUMP RETROFIT TO AN ELECTRICALLY HEATED MULTI-FAMILY BUILDING

During the 1960s and 1970s, electric baseboard heating systems were a common space heating approach in multi-unit residential buildings due to low installation costs, minimal use of interior space and the relatively low price of electricity. As a result, approximately 50% of apartment buildings in Canada have electric baseboard heating. However, rapidly increasing costs of electricity, concerns over environmental damage associated with conventional generating stations and the very age of most electric baseboards in apartment buildings will necessitate the development of alternative space heating strategies. This is a report of research to investigate the technical potential and economic benefits of retrofitting electrically heated apartment buildings with ground-source heat pumps. The report presents results of a literature and web search and review of available components and equipment suitable for the application, and analyses the most promising combination using an example building complex in the Greater Toronto area. Both the cases of no benefit and full benefit for central air conditioning are considered. Comparisons are drawn with retrofitting natural gas heating systems under the same circumstances. Conclusions and recommendations for new component development are identified and the economic results are as attractive under some circumstances as natural gas heating system retrofits.

Prepared by Caneta Research Inc. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 34 pages

Note: No. 03-118 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

STUDY OF NECESSARY CHANGES TO HARMONIZE STANDARDS REQUIREMENTS RELATED TO COMBUSTION VENTING

In the recent review of ventilation codes and standards, it became clear that standards from different agencies use disparate means of assessing whether a house chimney or vent is at risk. A contractor examined the requirements from each standard and drafted appropriate code language to present to those committees. These changes were presented to the CSA F326 committee in January 2003. A task group presented the CSA F326 preferred protocol to the standards committees for the gas, oil, and wood industries through the spring and summer of 2003, in hopes of harmonizing the requirements for all these standards. The gas and oil standards committees have created task groups to study the harmonization proposals. The wood industries standard is in line with F326. Work will continue through 2004.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24920200
STATUS : Ongoing

SURVEY OF IN-SUITE SPACE AND DOMESTIC HOT WATER HEATING SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

A project has been launched to survey in-suite space and domestic hot water heating systems in 9, 3½ storey and over, multi-unit residential buildings. The purpose of the project is to provide information on the design, installation and performance of in-suite fuel-fired space heating and domestic hot water systems that have been installed in multi-unit residential buildings. Surveys have been prepared for the property owners, managers and occupants to determine the extent to which in-suite systems meet the needs of each group. The project will identify the advantages and disadvantages of such systems and identify research issues. The project will be complete by December 2003.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22880200
STATUS : Ongoing

TUNE-UP GUIDE FOR MULTI-UNIT RESIDENTIAL BUILDINGS

A guide has been developed that compiles existing information on how on-site staff and contractors can improve, or fine tune, the performance of multi-unit residential buildings. Similar guidelines exist for commercial buildings but are referred to as re-commissioning guidelines. The guide will provide low cost and no cost methods to improve the performance of building envelope, space and domestic hot water heating, ventilation, health and safety, and electrical systems and appliances in multi-unit residential buildings. While the energy savings accrued are expected to be modest, use of the guide will ensure that buildings operate efficiently and performance problems are resolved before they become larger concerns. The Tune-Up guidelines will also allow a property owner or manager to establish optimal system conditions so that the impact of repairs, renovations, or energy and water efficiency improvements can be realistically evaluated. The Guide was completed in March 2003. A Research Highlight describing the Tune-Up Guidelines will be released by December 2003. CMHC will be field testing the Guidelines in Toronto and Saskatoon between September 2003 and March 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 23590200
STATUS : Ongoing

VENTILATION SYSTEMS FOR MULTI-UNIT RESIDENTIAL BUILDINGS: PERFORMANCE REQUIREMENTS AND ALTERNATIVE APPROACHES

The goal of this project was to assist CMHC in developing performance requirements and alternative approaches for innovative ventilation systems that overcome problems with conventional ventilation systems in multi-unit apartment buildings.

A review of conventional ventilation systems reveals that current designs for ventilation systems in MURBs do not work well for ensuring adequate indoor air quality. They suffer from a litany of complaints from occupants and building operators and owners about noisy systems, ineffective supply of ventilation air and removal of contaminants, and high-energy consumption.

To characterize improved ventilation system performance, practical performance parameters and targets were developed. Based on an evaluation of ventilation needs for residents of multi-unit residential apartments in Canada, it is recommended that ventilation rates from the current ASHRAE Standard 62-01 be used as a basis for performance, with those rates provided fully by mechanical systems rather than relying on infiltration for part or all of ventilation supply rates.

Four alternative ventilation systems that better meet these performance targets were developed and evaluated in terms of capital cost, energy use, and operating costs. The four systems are:

1. Passive inlet vents with suite based mechanical exhaust,
2. Balanced individual suite HRV units,
3. Balanced floor by floor system with heat recovery,
4. Balanced central system with heat recovery.

These alternative systems may not necessarily meet current building codes.

Based on analysis of these systems, the following observations can be made:

- System 1 provides some improvement in performance over conventional systems for a marginal cost of approximately $700 per suite.
- Systems 2 through 4 provide substantially improved performance in most or all areas at a marginal cost of between $1300 and $2300 per suite.
- Advanced ventilation systems with HRV's can exhibit more than a ten-fold reduction in operating cost over conventional ventilation systems and a five-fold reduction over similar ventilation systems without heat recovery.
- Energy cost savings of as much as $130 per suite per year are possible from advanced systems with heat recovery in new buildings.

Prepared by Craig Edwards, Innes Hood, The Sheltair Group Resource Consultants Inc. in association with Mario Kani, Allen Kani and Associates; Leslie Jones, Leslie Jones & Associates; Rob Dumont, Saskatchewan Research Council. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2003. 104 pages

Note: No. 03-121 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

BEST PRACTICE GUIDE FOR CURTAIN WALLS

The objective of this project is to develop a practical, advisory document - a Best Practice Guide (BPG) - for designers, architects and engineers, and manufacturers, related to curtain wall systems in housing applications. The curtain-wall is a well developed system in commercial applications but it requires special treatment when used in housing. The project will be conducted in partnership with curtain wall manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with Public Works Government Services Canada. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to curtain walls, construction details in CAD format, outline specifications and additional sources of information and references. A first draft of all chapters and details has been prepared. Expected completion date is end of 2003.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 2216 0200001
STATUS : Ongoing

BEST PRACTICE GUIDE FOR EXTERIOR INSULATION FINISH SYSTEMS (EIFS)

The objective of this project is to develop a practical, advisory document - a Best Practice Guide (BPG) - for designers, architects and engineers, and manufacturers, related to EIFS in residential applications. The project is being conducted in partnership with EIFS manufacturers and installers and their associations. This Guide will be produced as a joint publication through a collaborative project with the EIFS Council of Canada and the BC Wall and Ceiling Association. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to EIFS, construction details in AutoCAD format, outline specifications and additional sources of information and references. This BPG is expected to be released in late 2003.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 20470200
STATUS : Ongoing

BETTER BUILDINGS CASE STUDIES

This project documents and illustrates repairs and upgrades to multi-unit residential buildings across Canada. It is estimated that, in this country, $300 M are spent every year in premature building failures. CMHC is collecting and publishing easy to read case studies to present to owners, architects, builders and property managers what can go wrong and why, how to fix it and how much it will cost. Most cases will focus on the building envelope since the vast majority of documented problems occur there, in addition to examples of energy and acoustical upgrades. This project adds to CMHC's current documentation and publication of case studies on repair and retrofit of multiple-unit residential buildings. Ultimately, a repair guide will be developed based on this work. Case studies from across Canada are obtained from those directly involved in the repairs and involve buildings of all types of construction ranging in height from 3 to 50 storeys. Every year the Corporation publishes 10 Better Buildings Case Studies on CMHC's website: http://cmhc.ca/en/imquaf/himu/bebufa_021.cfm

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is available on the web

CIDN : N/A
STATUS : Ongoing

BOILER PIPING STUDY

The purpose of this External Research Program study is to examine boiler plants with typical configurations in residential high-rise buildings, using fire-tube, water-tube, and atmospheric, copper-fin boilers in order to: determine if the conditions would be suitable for the replacement of the boilers with Mid Efficiency Fan Assisted (MEFA) boilers, and; study the application of motorized 3-way valves, specifically to determine their impact on flows and return water temperatures to the boilers; if conditions are not suitable, to determine what alterations would be required for the installation of MEFA boilers, and; prepare guidelines for engineers and designers for projects involving the replacement of large mass boilers with MEFA boilers. This information is not currently available and is essential for estimating the energy savings to be gained in the use of more energy efficient MEFA boilers. The research project is near completion with a report to be available by the end of 2003.

CMHC Project Officer : *William Semple*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 2525 0218
STATUS : Ongoing

BUILDING ENVELOPE TEST HUT FACILITY PHASE 2 FEASIBILITY STUDY

CMHC, in partnership with the Homeowner Protection Office and Forintek Canada Corporation, provided the British Columbia Institute of Technology (BCIT) with a financial contribution to undertake and complete a study in order to assess and evaluate the feasibility of building, operating and maintaining a Building Envelope Test facility in which the response of wall assemblies to 'real-time' weather load, as experienced in the coastal climate of British Columbia, can be evaluated. The project is expected to be completed by the spring of 2004.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 2384 0200
STATUS : Ongoing

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project reviewed Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites based on the number of building permits issued since 1970. Using STATSCAN data, it was concluded that approximately 6,000 condominium buildings exist in Canada. Based on discussions with the Canadian Condominium Institute and other agencies, this estimate likely understates the number of buildings. The review also found that buildings could not be classified by the number of storeys nor number of units using STATSCAN data. Based on the outcome of this project, CMHC initiated another project with the University of Ottawa to review the data available on condominiums within municipal files. The project revealed that the data exists within the local land registry office but was difficult to extract given the state of the individual files. Nevertheless, the University of Ottawa was able to characterize the population of condominiums in the greater Ottawa area in terms of number of buildings, number of units, number of storeys and age. A report and Research Highlight documenting the project findings will be released in December 2003. CMHC will be exploring opportunities to work with other universities to characterize the population of condominiums in other municipalities in order to build on this work.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 2277 0200001-2
STATUS : Ongoing

CMHC RESEARCH PROJECT: SURVEY OF MULTI-UNIT RESIDENTIAL BUILDING CHARACTERISTICS AND ENERGY USE DATA

This project was conducted to record the physical and operational characteristics and energy and water consumption of multi-unit residential buildings in Canada. While property owners and managers generally record the energy and water consumption of their stock of buildings, data has not been available to allow energy and water consumption to be related to building parameters such as size, construction, age, occupancy type and location. The building files have been compiled into the CMHC HiSTAR database so that building files can be compared and baseline energy and water use in multi-unit residential buildings can be determined.

STATUS : Completed

AVAILABILITY : No report will be published at this time.

CONDITION SURVEY OF CONDOMINIUMS IN THE GREATER TORONTO AREA (GTA)

This project's objective is to carry out a condition survey of condominiums in the Greater Toronto Area. This project collected data on 209 townhouse and high-rise condominiums and examined the relationship between condition and financial health for these properties as representative of the condo stock in the GTA. The data was analyzed and Condition and Funding Indices were developed as tools which can aid owners and property managers. These indices are useful to benchmark the relative health of properties and to assist in the planning of repair work and reserve funding. The study will be summarized in a Research Highlight late in 2003.

CMHC Project Officer : *Sandra Marshall*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 21610200

STATUS : Ongoing

CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE

The project surveyed design and construction professionals and property managers of existing converted buildings across Canada to determine the extent and nature of technical problems which were encountered in the design and construction phases of the conversions; to determine the perception of property managers as to the concerns of the occupants; to determine the technical problems which have arisen as a result of these conversions; and to determine if there were any attempts to improve energy use performance or to introduce features to improve the sustainability of these buildings. Selected buildings are documented and will appear as case studies in CMHC's Better Buildings/Innovative Buildings information series.

CMHC Project Officer : *Sandra Marshall*

Division : Policy and Research Division

AVAILABILITY : Product is not yet on the web

CIDN : 22420200

STATUS : Ongoing

DEVELOPMENT OF THE HIGH-RISE STATISTICALLY REPRESENTATIVE HOUSING DATABASE (HISTAR) TASK 2: COLLECTION OF ADDITIONAL BUILDING FILES FOR THE HISTAR DATABASE

CMHC has commissioned a research project to gather information to characterize the energy and water consumption patterns in multi-unit residential buildings. This data will be used to supplement the data contained in the CMHC HiSTAR database. The HiSTAR database is used to baseline water and energy use in multi-unit residential buildings and is also used to evaluate the impact of building and occupancy characteristics and location on energy and water use. The HiSTAR database now contains 81 building files. More files will be solicited over time.

STATUS : Completed
AVAILABILITY : No report is planned at this time.

FIRE AND ACOUSTICAL PERFORMANCE OF FLOOR ASSEMBLIES - PHASE II

Sound attenuation measures between suites in multi-unit residential buildings often conflict with the National Building Code (NBC) requirements for fire separations. An earlier series of tests provided valuable data that will be included in the current edition of the NBC. This new phase of the project will try to fill the remaining gaps in the testing. A dozen industry and government partners have formed a consortium with the National Research Council of Canada. Testing will be carried out over 4 years with a total budget of $2.2 million. Results will be incorporated in the National Building Code of Canada. Both full and small scale fire and sound testing will be carried out. A large database, similar to an expert system, will be developed which designers and builders can use for reference. Particular attention will be given to assemblies likely to just obtain an STC 50 rating while still meeting the fire separation requirements.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 23750200
STATUS : Ongoing

FIRE AND SOUND CONTROL IN WOOD-FRAME, MULTI-FAMILY BUILDINGS. BEST PRACTICE GUIDE, BUILDING TECHNOLOGY

This guide shows how to control the spread of fire and the transmission of sound between dwelling units in wood-frame, multi-family buildings. It focuses on the design and construction of the interior walls and floors that separate one dwelling unit from another. It highlights the results of research performed by the National Research Council of Canada for Canada Mortgage and Housing Corporation (CMHC) and others, and uses it as a basis for the best practices that can be applied to design and construction.

Prepared by Michael Lio, Lio & Associates with the assistance of the Institute for Research in Construction, National Research Council of Canada. CMHC Project Officer: Ken Ruest. Ottawa: Canada Mortgage and Housing Corporation, 2002. 140 pages + CD-ROM

Order number: 62942 **Price: $89.00 + GST and handling charges

Note: Aussi disponible en français sous le titre : Protection contre le feu et isolement acoustique des collectifs d'habitation à ossature de bois

STATUS : Completed Report
AVAILABILITY : CMHC Information Products

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1900's vintage apartment buildings in the Ottawa area. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings. The case study reports will be available by December 2003.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing

IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL ASSEMBLIES - COQUITLAM, BC

Wood framed buildings in the Vancouver area have experienced excessive moisture damage to the sheathing boards and wood framing over the past decade. This applied research project, funded by Canada Mortgage and Housing Corporation in partnership with Polygon Homes Ltd., involves the development of a building envelope diagnostic tool, specifically, an in-situ monitoring method to diagnose causes of moisture problems in low-rise wood-framed construction. This method is important to residential building owners as it can be used to develop cost effective remedial repair recommendations and to promote better design and construction guidelines for new buildings. This project's objective is to monitor the performance of the exterior wall assemblies of two, 46 unit four-storey buildings in Coquitlam, BC. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Exterior walls, including interior living spaces as well as interstitial wall areas, will be monitored for temperature, relative humidity, wood moisture content and air pressure differentials. A weather station, mounted on the roof of one building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring of the buildings began in January 2001. Data collection will continue until the spring 2002. Project completion is expected by the end of 2003.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22540200
STATUS : Ongoing

IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL SYSTEMS - VANCOUVER, BC

Wood framed buildings in the lower mainland of British Columbia have experienced excessive moisture damage to both sheathings and framing materials. In recent years, with the adoption of Best Practice principles throughout the construction industry (by builders and developers, design professionals and various construction trades) coupled with regulatory amendments to the City of Vancouver building by-laws, a new generation of exterior wall assemblies incorporating a 'rainscreen' moisture management strategy has been constructed. How effective were these walls at managing the exterior moisture loads? The objective of this applied research project, funded by Canada Mortgage and Housing Corporation, is to monitor, assess and document the performance of a residential low-rise four storey, wood-framed building which incorporates rainscreen design technology, and to analyze data to determine the effectiveness of wood frame rainscreen wall assemblies at managing exterior moisture loads. Monitoring of interior, exterior and interstitial wall areas will include temperature, relative humidity, wood moisture content and air pressure differentials. A weather station mounted on the roof of the building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Project completion is expected by the end of 2003.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 22540200
STATUS : Ongoing

INNOVATIVE BUILDING CASE STUDIES

Innovative Buildings case studies document new projects of particular interest to architects and other building professionals. They showcase built projects which use new technologies, sustainable features and innovative planning attributes, among other notable features. As they are completed the studies are showcased on the CMHC website at http://www.cmhc-schl.gc.ca/en/imquaf/himu/buin_009.cfm.

"District Lofts" case study shows the innovative design, systems and construction details of a Toronto condominium building featuring single loaded corridors. "Learning from a Fire: Design and Construction of Infill Housing" describes the causes and consequences of a fire which destroyed an infill housing development in Ottawa, and provides suggestions to prevent similar occurrences. "Fairmont Waterfront Building" provides details on the construction of a food-producing green roof in Vancouver.

CMHC Project Officer : *Sandra Marshall*
Division : Policy and Research Division
AVAILABILITY : Product is available on the web
CIDN : 08400306
STATUS : Ongoing

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing. The results of the study will be published as a CMHC Research Highlight by November 2003.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 22010200
STATUS : Ongoing

MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hygIRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hygIRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures before they are recommended to the building industry. The project will be completed by March 2004.

CMHC Project Officer : *Duncan Hill*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 1934 0200003

STATUS : Ongoing

MONITORED PERFORMANCE OF AN INNOVATIVE MULTI-UNIT RESIDENTIAL BUILDING: FINAL REPORT

A research project was undertaken to investigate a wide variety of aspects in an innovative condominium building in Dundas, Ontario. The 48 unit, 6 storey building was designed to use 35% less energy than a similar building designed to just meet the MNECB. To better understand the operation of the building a comprehensive monitoring and evaluation program was undertaken. The monitoring program consisted of one-time measurements of envelope airtightness, indoor air quality, ventilation system performance and air movement. A PC-based data acquisition system was installed. Performance monitoring included the heating systems, building envelope, and ventilation systems. Monitoring was undertaken to understand long-term system performance, indoor air quality and overall energy performance. Short-term testing was also undertaken to investigate building air tightness and indoor air quality issues. A quantitative analysis of the performance of these areas is presented. The benefits and shortcomings in each area are examined.

Prepared by Enermodal Engineering Limited. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2002. 134 pages

Note: No. 02-135 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

PERFORMANCE EVALUATION OF RETROFITTED SOLID MASONRY EXTERIOR WALLS

The purpose of this External Research Program project is to establish the relationships between the initial composition of the wall and the retrofit (particularly the insulating of previously uninsulated exterior walls) and the condition of the building envelope after it has been exposed to given indoor and outdoor loads for a given period of time. A sample of between 15 to 20 buildings located in the Montreal and surrounding areas is envisioned for the study. Various solid masonry wall compositions, building ages, renovation dates and retrofit solutions will be examined. The documented information will include: operating conditions, reports of water infiltration or condensation, and the overall visual condition of the wall. Calculations to determine the condensation potential of the wall systems will be performed using a simple, recognized, steady state one-dimensional model. The buildings will be grouped by categories, with the collected data presented in table form. A photographic record of each building will be carried out. The survey and analysis of the field performance data will give practitioners a knowledge bank on the performance of solid masonry wall buildings that does not presently exist. The project is scheduled for completion by December 2003, with a report available in the summer of 2004.

CMHC Project Officer : *William Semple*

Division : External Research Program

AVAILABILITY : Product is not yet available

CIDN : 25250217

STATUS : Ongoing

RAIN PENETRATION CONTROL SEMINAR

Water penetration is a very frequent, recurring problem for building owners, leading to damage of building components, interior finishes and building contents. It frequently leads to high repair costs and possible litigation. Over the past few years, research undertaken by CMHC, has contributed to the understanding and the prevention of rain penetration. In particular the pressure-equalized rainscreen has been applied and refined. In this seminar the causes of rain penetration will be examined. The results of CMHC research will be presented, along with design features and practical details, which will help prevent rain penetration in a variety of wall types. This full day seminar is targeted to architects, engineers, specifiers, builders, developers and building owners concerned about rain penetration and how to prevent it. The seminar was presented in Toronto, Winnipeg, Edmonton, and Vancouver. It will be presented in Montreal and Quebec City in spring 2004. This seminar was developed in cooperation with the Canadian Masonry Association, the Canadian Precast Concrete Institute and the Exterior Insulated Finish Systems (EIFS), curtain wall and steel manufacturers.

CMHC Project Officer : *Luis de Miguel*

Division : Policy and Research Division

AVAILABILITY : Seminar/training is available

CIDN : 08380303

STATUS : Ongoing

TECHNOLOGY ROADMAP FOR INTELLIGENT BUILDINGS

In the fall of 1999, the Federal Interdepartmental Forum on Construction Technology, which has representatives from the department of the Government of Canada with a major interest in construction innovation issues, identified the lack of understanding of the challenges and opportunities in the general areas of intelligent building technologies as a significant national issue. This lead to the proposal to create the Technology Roadmap for intelligent building technologies. The Continental Automated Building Association (CABA) was approached to determine if private industry would participate actively in the initiative.

For the purposes of this report intelligent building technologies have been defined as: "The use of integrated technological building systems, communications and controls to create a building and its infrastructure which provides the owner, operator and occupant with an environment which is flexible, effective, comfortable and secure".

This Technology Roadmap explores and explains the current status and imminent opportunities offered by the accelerating evolution and use of intelligent building technologies. The focus is on commercial, institutional and high-rise residential buildings, both new projects and retrofits, in a five year time horizon.

Prepared by IBI Group. Managed by CABA staff under the guidance of the Technology Roadmap Steering Committee. Financial support provided by Industry Canada, National Research Council Canada, Public Works and Government Services Canada, Natural Resources Canada, and Canada Mortgage and Housing Corporation. Ottawa: Continental Automated Building Association, 2002. 60 pages

Note 1: Aussi disponible en français sous le titre : Carte routière technologique du bâtiment intelligent

Note 2: No. 03-114 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Product is available on the web: www.caba.org/trm/

TESTING OF DYNAMIC BUFFER ZONE (DBF) METHOD

A brick veneer steel stud building in Ottawa has been studied by CMHC during the past six years to verify several performance factors. A new strategy to prevent condensation on the back of the brick cladding and moisture inside the back-up wall has been suggested. The concept is known as the Dynamic Buffer Zone (DBZ). The DBZ consists of introducing dry, temperate air in the air space behind the brick cladding. The dry air absorbs the condensation and should increase the durability of the wall assembly. This project's objective is to proceed with testing a Dynamic Buffer Zone (DBZ) method in the air space behind brick cladding. The wall will be monitored for a year. Due to technical difficulties, testing had to be redone over Fall & Spring 2002/2003. Report is expected December 2003.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 04110305
STATUS : Ongoing

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

WORKSHOP ON WOOD CONSTRUCTION DETAILING

This project will produce material for a one-day workshop on wood-frame detailing for new buildings, addressed to architects, engineers and designers, with a focus on durability, buildability, acoustic performance and fire safety, based on various CMHC publications. The workshop is modelled after others CMHC has presented across Canada. After a brief introduction on Building Science, participants are presented with actual construction details which they analyze for air barrier and thermal continuity, condensation and rain penetration control. Subsequently, they re-design the details to optimize performance. The afternoon session deals with fire and sound issues in a similar manner. Registration is limited to 52 participants who work individually and in groups of 13. The dates, venues and registration information for the workshop may be found on CMHC's Calendar page: http://www.cmhc.gc.ca/en/evca/

CMHC Project Officer : *Luis de Miguel* **CIDN** : 25340200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Seminar/training is not yet available

HOME OWNERSHIP

CONDOMINIUM BUYER'S GUIDE

This guide was developed to assist buyers in choosing a condominium which meets their personal and financial needs. The guide provides buyers with an overview of the operation of different condominiums and important questions to address when choosing a condominium to meet the lifestyle and financial needs of the buyer. In addition, the guide provides instructions on evaluating the financial and physical status of an existing condominium. Information on evaluating the physical condition of the individual unit, the condominium building and grounds, and the financial status of the condominium is also covered. Contact information for acquiring additional information and assistance is included.

CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, c2002. 37 pages.

Note : Aussi disponible en français sous le titre : Logements en copropriété - guide de l'acheteur

STATUS : Completed Report *Order no. 63100*

AVAILABILITY : CMHC Information Products

HOUSE CONSTRUCTION

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION - UPDATE

The purpose of this project is to update CMHC's Canadian Wood-Frame House Construction guide to reflect the changes which are to be made to the 2005 edition of the National Building Code of Canada. The CWFHC content will also be updated to incorporate results from current research and improved housing construction techniques. Proposed changes to the NBC include changes in requirements for stairs and railings, mechanical ventilation, protection from precipitation ingress, carbon monoxide detection, and means of egress from basements. As a result of recent research, additional information will be incorporated such as information on proper window installation. This work will be completed in 2004 so the updated version can be released at the same time as the 2005 NBC.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 26990200
STATUS : Ongoing

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION TECHNIQUES AND PRACTICES FOR APPLICATION IN OTHER CLIMATES

This research project will demonstrate how to adapt Canadian wood-frame house construction techniques and practices for application in other countries with different climates. CMHC's Canadian Wood-Frame House Construction (CWFHC) will serve as the reference to demonstrate the differences in construction practices and techniques for other climates. A CWFHC supplement will be produced as a Research Report, following the CWFHC format. It will include relevant text and illustrations to explain the difference in approach, focus on the durability of the building envelope, and cover other related aspects of construction (e.g. ventilation and cooling strategies, termites and weather related conditions such as cyclones). Completion of the research is expected by the spring of 2004 and the report will be available by the summer of 2004.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 27290200
STATUS : Ongoing

CASE STUDY OF CARMA CENTRE FOR EXCELLENCE

This case study will examine the goals, strategies and activities of the Carma Centre for Excellence in Home Building and Land Development which is addressing the development and maintenance of a skilled housing construction and sales work force in Calgary. The study will explore the degree to which, and how, the Carma Centre could be successfully replicated elsewhere in Canada. It would also explore and identify future research which could potentially support the Carma Centre and any future replications of it. The study will be completed by September 2004, with a report available in the spring of 2005.

CMHC Project Officer : *William Semple*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 28160200
STATUS : Ongoing

COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO

CMHC supported this Alberta Housing Industry Technical Committee (AHITC) research project.. The research used laboratory and field testing to compare the performance of two coat stucco commonly used in the Prairies and standard three coat stucco. If they were to perform similarly, building code changes may be recommended. The laboratory work was not conclusive but two coat stucco did not show the same strength as the code-required three coat. Field tests in Calgary and Edmonton houses showed that both two coat and three coat stucco on new houses were having problems with cracking and serviceability, and that improvements should be made to installation practice. There was an inadequate sample of three-coat stucco houses in the survey to allow a statistically valid comparison between the failure rate of two and three-coat stucco. The field work is complete. A Research Highlight will be issued in 2004.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 2399 0200
STATUS : Ongoing

COMPARISON AND ANALYSIS OF PROVINCIAL BUILDER/RENOVATOR INDUSTRY CERTIFICATION PROGRAMS

The purpose of this research project is to investigate the current situation of the provincial builder and renovator programs that exist and to do a comparative analysis of the various programs. The first part of this research will link the specific skills attained from the course material forming part of the builder/renovator program to the existing Occupational Analysis for the occupation. The second part will compare all aspects of the programs including for example, prior learning assessments, continuing education requirements, regulations, courses, examinations, evaluations, and course delivery. This research will show how the courses and programs vary from province to province as well as their commonalities. This project has been contracted and the research is anticipated to be completed by spring of 2004.

CMHC Project Officer : *Darrel Smith* — ***CIDN*** : N/A
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

DEVELOPMENT OF HIGH PERFORMANCE STUCCO FOR DURABLE HOUSING CONSTRUCTION

The objective of this research project is to investigate the opportunities to engineer a Portland cement stucco material that will limit liquid water entry on its external surface while at the same time allow water vapour to diffuse (dry) out of it. This research project considers stucco as a material component of an ideal wall system; it does not look into system performance. The effects of possible imperfections, which may occur due to prevalent construction practices, present in the wall system are beyond the scope of this investigation. CMHC undertakes this work in partnership with the National Research Council of Canada, Institute for Research in Construction (NRCC/IRC). The project is expected to be completed by the end of 2004.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 27100200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FEASIBILITY OF DEVELOPING A BUILDING CANADA PROGRAM

The purpose of this project by EnerQuality Corporation is to examine the feasibility of developing a Building Canada program similar to the Building America model. To be effective, the Canadian program needs to be of interest to Canadian builders and recognize the different environment by responding to their real needs, i.e., reducing construction costs, customer callbacks, warranty claims, construction time, and construction waste, while at the same time improving the energy efficiency of their new houses. The program will result in little or no additional cost for the builder and where ever possible a reduction in costs. This study is a necessary first step to determine if a Building Canada program is viable and could be established in Canada. It will draw from the experience of the Building America program as well as the results achieved in a pilot of this program with large Canadian builders. This project is being managed by EnerQuality Corporation on behalf of a consortium of partners including; CMHC, Enbridge Consumers Gas, Union Gas, Owens Corning, and Natural Resources Canada. The program is currently being piloted with a few builders which will be completed in 2003. Once this initial program design phase and pilot have been completed, and if found feasible, the program will be launched and expanded as part of subsequent phases.

CMHC Project Officer : *Darrel Smith* — ***CIDN*** : 23870200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

GENERIC GUIDE FOR ENGINEERED WOOD I-JOIST FLOOR SYSTEMS

The purpose of this project is to produce an illustrated research report which will serve as a generic guide for the proper installation of engineered wood I-joist floor systems. The guide will be written primarily for builders but will also be of benefit to building officials. It will include general information and illustrations showing proper construction details such as: cantilever details, web stiffeners, squash blocks, header and stringer connections and point loads. The guide will also cover topics such as framing, storage and handling techniques, IAQ issues, fire endurance, etc. A review committee comprised of the Canadian Wood Council, Engineered Wood Association (APA), building officials, industry representatives, CCMC and CHBA will be assisting with the development of this guide. The project is underway and it is anticipated that the research component will be completed by the end of 2003. The research report and accompanying pocket guide will be published by May 2004.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26980200
STATUS : Ongoing

RESEARCH ON SOLUTIONS TO PYRITE-RELATED BACKFILL EXPANSION PROBLEMS

This study will draw up an inventory of the problems associated with the reactions of the pyrite (iron sulphide) contained in the backfill stone used under slabs in residential properties. Two hundred houses inventoried in three Montreal South-Shore municipalities will be visited under the CTQ-M200 protocol developed as part of the work of the Quebec technical committee on pyrite-related problems. The results of the study will identify possible causes and potential affordable solutions. The objective is to provide the industry with a more global vision of this new situation.

CMHC Project Officer : *Jacqueline I Meunier-Bureau*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing

ROOF TRUSS DESIGNS WITH NAILING SCHEDULES

The purpose of this project is to develop guidelines on standard simple roof truss designs (Fink "W") covering a limited range of loading conditions and spans. The guidelines will include illustrations and tables providing details on the top and bottom chords, webs, plywood gusset plates and nailing patterns. These prescriptive guidelines will serve as an alternative to having to use engineered roof trusses or conventionally framed roof systems. The information from this research will be incorporated into the 2005 edition of the Canadian Wood-Frame House Construction publication and CD ROM. This research will be completed in 2003 followed by a research report available by early 2004.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30160200
STATUS : Ongoing

SEISMIC UPGRADES TO LOW-RISE HOUSING

Design and construction practices have indirectly resulted in a progressive decline in the earthquake (seismic) performance of a majority of residential wood-frame buildings of more than one storey in height. With funding provided by CMHC, this work will identify practical, cost-effective changes in current residential wood-frame construction, and retrofit design and practice that will substantially reduce vulnerability to damage during strong earthquake events. Results from this research are expected by the spring of 2004.

CMHC Project Officer : *Silvio Plescia* ***CIDN*** : 25380200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SKILLED CONSTRUCTION LABOUR SEGMENTATION

The purpose of this project is to document the material labor similarities and differences amongst residential construction, commercial construction (e.g. retail establishments), institutional construction (e.g. hospitals, schools), industrial construction (e.g. factories) and public works (e.g. roads, bridges), where residential construction would be divided into single-family, multi-family low rise and high-rise. This research will be carried out using, for example, information from the National Occupational Classification (NOC) data base.

CMHC Project Officer : *Bruno Duhamel* ***CIDN*** : 27610200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

WOOD-FRAME CONSTRUCTION, FIRE RESISTANCE AND SOUND TRANSMISSION

For many years, wood-frame construction has been providing Canadians with high-quality, affordable housing. This goes from town houses to multi-storey apartment buildings, and from single-family bungalows to large luxury houses. The intent of this brochure is to provide some background on fire safe construction concepts, as well as examples of wood-based light-frame building systems designed to maximize fire safety and the reduction of sound transmission between dwelling units.

Forintek Canada Corp., Société d'habitation du Québec and Canada Mortgage and Housing Corporation, c2002. 12 pages.

Note : Aussi disponible en français et en espagnol. Le titre en français : Construction à ossature en bois, résistance au feu et transmission du son.

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

DESIGN MULTIPLE-UNIT CHUM'S AND MODULAR HOUSE PACKAGES FOR URBAN AND SUBURBAN, REMOTE AND NORTHERN COMMUNITIES

The purpose of this project is to support the preparation of design drawings, construction specifications and cost estimates for several Multi-Unit CHUM's (Containerized Heat and Utilities Modules), and for matching Modular House Designs that would integrate with these CHUM's, specifically for the suburban and rural, remote and northern communities contemplated. A CHUM provides on-site utility services for housing. Emphasis has been placed on cluster housing and cluster infrastructure. The project is scheduled for a fall 2003 completion. A draft version of a design manual has been produced in both a printed format and as a CD-ROM. The manufactured housing industry has been a key participant and supporter of this project.

CMHC Project Officer : *Chris Ives*
CIDN : 24070200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

FLEXHOUSING CONSUMER DEMAND AND INFORMATION NEEDS IN B.C.

This report examines the new approach to home design, building and renovation called FlexHousing. FlexHousing is a concept in housing that incorporates, at the design and construction stage, the ability to make future changes easily and with minimum expense, to meet the evolving needs of its occupants. This approach means that people are able to reside in the same dwelling for longer periods of time by more easily making affordable alterations to the home, including a wide range of possible adaptations that suit changing life stage needs.

The objectives of this research project were:

- to assess overall awareness and attitudes toward FlexHousing by home buyers and home renovators (i.e. consumers) in British Columbia;
- to segment consumer demand and awareness of FlexHousing into first-time and repeat buyers as well as home renovators;
- to identify the key 'influences' of consumer preferences in purchasing or renovating a home; and
- to identify any gaps in knowledge that consumers might have with regard to FlexHousing.

The findings of the project included the following:

- While few have heard of the concept, when provided with a brief description, interest levels were high regarding FlexHousing. Approximately two thirds (65%) of those surveyed were 'very' or 'somewhat' interested in the concept;
- When projected over the entire population, 21% would be potential FlexHousing consumers over the next five years. A total of 17% would potentially purchase a Flex home, while another 5% would initiate a major renovation that includes FlexHousing features;
- The reasons for interest in FlexHousing were varied and included: (a) ease of future renovations or improvements; (b) the ability to adapt to changing household circumstances; (c) improved access for the elderly among those 55+; (d) eliminate the need to move and associated costs; and, (e) positive impact on resale value of the home.
- The highest priority appears to be given to those features than can serve a useful purpose regardless of the life stage of the homeowner, and which appear to entail relatively little cost
- Although the benefits were apparent and considered desirable, there was widespread agreement that Flex features should not leave a home looking like it has been built for a handicapped person (due to perceptions that this would negatively affect resale value).

- Those planning on purchasing a home within the next five years said they would pay on average $15,655 above the cost of a conventional home for one with Flex features (representing a 6% increase over the anticipated cost of their future home).
- Renovators would pay an additional $6,115 for Flex features, representing a 42% increase over the expected average cost of their next renovation.
- Information consumers would like to have about FlexHousing included: (a) types of features that can be incorporated to meet a person's specific needs; (b) cost implications of Flex features; (c) construction and installation tips; (d) building code and zoning bylaw restrictions; and, (e) a list of reputable contractors that are knowledgeable and experienced in FlexHousing concepts.

Prepared by McIntyre & Mustel Research Ltd. CMHC Project Officer: Norm Connolly. Ottawa: Canada Mortgage and Housing Corporation, 2003. 2 volumes

STATUS : New Completed Report

AVAILABILITY : Available on a loan basis only from the Canadian Housing Information Centre

RICHMOND FLEX HOUSING PROJECT

This project's objective is to evaluate the Richmond Flex House Demonstration Project in terms of: It's impact on housing affordability relative to similar market housing; the creation of a flexible and adaptable design that meets changing household needs; whether it exhibits neighbourhood compatibility, and; measurement of the level of marketability of the overall concept and its acceptance by home builders, developers, and prospective home buyers.

CMHC Project Officer : *Norm Connolly*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 27540200

STATUS : Ongoing

INDOOR ENVIRONMENT

CMHC'S CONTRIBUTION TO THE NRC CONSORTIUM ON MATERIAL EMISSIONS AND INDOOR AIR QUALITY MODELING

An industry consortium on material emissions and indoor air quality modeling (CMEIAQ) led by NRC includes CMHC, NRCan, Health Canada and the private sector as partners. A first phase of the NRC consortium developed a database of emissions of selected building materials and an IAQ prediction model. Phase II will expand the database, target the most problematic volatile organic chemical emissions, and will provide better understanding of material emission control strategies for new and renovated buildings. CMHC's contribution is in support of the consortium's Technical Advisory Committee.

CMHC Project Officer : *Virginia R Salares*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 28130200

STATUS : Ongoing

CONTRIBUTION TO 'A FEASIBILITY STUDY FOR INVESTIGATING THE RELATIONSHIP BETWEEN INDOOR AIR QUALITY AND SEVERE RESPIRATORY TRACT INFECTIONS IN INUIT INFANTS IN BAFFIN REGION, NUNAVUT

CMHC has made a contribution to a feasibility study investigating the relationship between indoor air quality and severe respiratory tract infections in Inuit infants in Baffin region, Nunavut. The work was carried out in conjunction with the Children's Hospital of Eastern Ontario, Health Canada, Natural Resources Canada, the Nunavut government and Nunavut health and housing agencies. Testing took place over the winter of 2003 in 20 houses in Cape Dorset, including air quality measurements, blower door testing, and long term air change rate measurement. These results are being analyzed. If significant air quality problems are identified through this testing, there are plans to expand the test program to other Nunavut communities.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 27570200
STATUS : Ongoing

DEPRESSURIZATION RESISTANCE TESTING

There are two projects under this title. One project is supporting the development of testing procedures to be used in wood burning appliance standards to determine the depressurization resistance of various appliances. The lab testing procedure appears to be more complicated than originally envisioned. The test protocol had difficulty dealing with appliances (such as woodstoves) that had a variable output and a cycle measured in hours. It may be appropriate for appliances with more consistent performance, such as pellet stoves or fossil fuel fired appliances. A report is being prepared. Another project is surveying 100 appliances in Peterborough to see if theoretically "spillage-resistant" appliances can operate under significant house depressurization. From the data gathered so far, most of the spillage-resistant appliances can operate safely at up to 50 Pascal of negative pressure. This project is scheduled for completion by the end of 2003.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24920200
STATUS : Ongoing

HEALTHY INDOORS PARTNERSHIP

This project is a collaboration between government, industry and the private sector to implement the Healthy Indoors Partnership (HIP) vision and business plan for improving indoor environmental quality in Canada. The mandate of the Healthy Indoors Partnership, incorporated in 2003 as a not-for profit organization, is to bring industry, government and nongovernment organizations together to identify, develop, implement and manage activities, such as inter-agency research, designed to create healthier indoor environments in Canada. CMHC will collaborate on HIP Indoor Air Quality consultation, research and information initiatives of common interest.

CMHC Project Officer : *Ken Ruest*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 23830200
STATUS : Ongoing

INDOOR AIR QUALITY TROUBLE SHOOTING GUIDE FOR PROPERTY OWNERS AND MANAGERS

A guide for identifying and resolving indoor air quality problems in multi-unit residential buildings will be developed for property owners and managers. The guide will provide instructions for detecting, identifying and resolving common problems relating to the indoor environment in both common areas and individual apartments. Information will also be provided as to when such activities should be referred to an expert. The guide is primarily directed at owners and managers but the information on specific problems and solutions will be presented in such a way that it could be provided to the occupants of individual apartments. The project will be completed by September 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 3050-PLN03
STATUS : Planned
NEW

INDOOR PARTICULATE AND FLOOR CLEANING

The objective of this study was to evaluate several cleaning methods on several surfaces with respect to their relative effect on the particle matter (PM) exposure of an individual living in the home. Secondarily, the study sought to demonstrate a new approach to evaluation of floor cleaning methods by using a "standard activity" to quantify PM resuspension from the floor on the premise that more effective cleaning would result in less resuspension after cleaning.

All of the experiments were based on five homes in Brantford Ontario and the test conditions replicate typical southern Ontario Canadian spring, fall and winter conditions. The cleaning devices were employed in a manner which is representative of normal cleaning practice. Over 1300 experiments involving six electrically powered and four non-powered cleaning devices were carried out. The experiments consisted of a "simulated activity" prior to cleaning, cleaning of the floor and a simulated activity immediately following cleaning. Cleaning was carried out weekly in one room of each house by the same operator using a different device each week. At a pre-determined point in the sequence, the carpeted floor was replaced by a smooth floor and the cleaning program was repeated.

Results show that carpeted floors exhibit higher levels of PM resuspension than smooth floors in all size ranges except that this tendency is not so pronounced for very fine (PM1) particles. The tendency for a floor to accumulate particles over time appears to be much more pronounced for carpeted floors than for smooth floors and it also varies greatly from house to house. Based on limited data, it appears that new carpet exhibits lower PM resuspension rates than old carpet and slightly higher PM resuspension rates than smooth floors. It is possible that the higher accumulation rate for carpets is responsible for their higher resuspension rates with aging.

The ordinary house broom was found to have high PM resuspension rates during use, but the cleaning effectiveness was similar to other devices. Dry or wet pad smooth floor sweeping devices were not found to have better effectiveness than a conventional dust-mop.

Prepared by Bowser Technical Inc. Principal Investigators: Dara Bowser and Sandra Vos. Prepared for Policy and Research Division. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003. 2 volumes
Volume 1 Main Report (27 pages) Volume 2 Appendices (12 pages)

Note: No. 03-104 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

INFLUENCE OF AN ELECTRONIC AIR CLEANER ON INDOOR OZONE

Plate and wire type Electronic Air Cleaners (EAC) are frequently found in the central forced air systems of Canadian houses. They are often sold on the basis of their potential to relieve the symptoms of those who suffer from allergy-related and respiratory conditions. It is known that these devices produce ozone during operation, and ozone is a known respiratory irritant. Recent findings lead to the possibility that EAC devices may contribute to raising indoor ozone levels which could have a negative health impact.

Experiments were carried out to determine the degree to which ozone levels are influenced in a home due to the operation of an EAC and whether or not the ozone levels are affected by changes in house ventilation rate and changes in airflow through the device. All of the experiments were based on one air-handler and EAC arrangement in one home in Brantford, Ontario, Canada, during November and December 2000. A total of 185 hours of data were obtained under varying conditions of house ventilation, EAC airflow and EAC operation. The air-handling system was operated continuously and all of the windows were kept closed.

Samples were obtained using a real-time data acquisition system using a UV Photometric ozone monitor sampling from outside, upstream of the EAC, office area (basement), downstream of EAC, bedroom (upstairs). Continuous weather data was used to predict air exchange rates.

Data was analyzed using a model which accounted for air-change, internal removal, source strength, and filtration of incoming air. Using house characteristics and source-strength values obtained from the experiments, inside ozone levels were predicted for a variety of air-change rates and outdoor ozone levels.

It was concluded that the continuous operation of an EAC could result in a rise of inside ozone concretion by 7 to 10 ppb higher than that which would normally be expected without EAC operation, or with intermittent EAC operation. Ozone concentration increase can be expected to be higher than this for smaller homes and homes with more smooth surfaces (e.g. smooth floors in place of carpeted.) Conversely, the increase will be lower for larger homes with less smooth surfaces.

Changes in airflow through the EAC had a minor effect on ozone levels. Reducing the airflow by 50% resulted in an increase of ozone production and interior levels of less than 10%.

No conclusions were able to be reached concerning the effect of ventilation and filtration by the building envelope due to the lack of difference between indoor and outdoor ozone levels experienced during the experimental period.

As a consequence of these findings, winter-time indoor/outdoor ratios used for predictive population studies may require revision upwards from current estimates for houses equipped with continuously operating EACs. Summer-time I/O ratios for air-conditioned houses may also require revision if the house also contains an EAC.

In homes equipped with an EAC and a continuously operating air-handling system, it is possible that the indoor air will exceed the 1 hour health-based Reference Level values for outdoor air proposed by the Canadian Federal-Provincial Working Group on Air Quality Objectives and Guidelines. EAC devices appear to be capable of elevating the ozone level inside a home to levels which are continuously at or above 10 ppb.

Prepared by Bowser Technical Inc. Principal Investigator: Dara Bowser. Prepared for Policy and Research Division. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003. Volume 1 Main Report (23 pages) Volume 2 Appendices (14 pages)

Note: No. 03-117 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

LET'S CLEAR THE AIR INDOOR AIR QUALITY (IAQ) INITIATIVE

This initiative delivers information on indoor air quality in the home to targeted audiences, the end result of which will benefit Canadian homeowners and occupants. Basic information to increase awareness and appreciation of indoor air problems is through the one-day Let's Clear the Air seminar for housing and health professionals. A second day consisting of a site visit to a home with an IAQ expert demonstrates the IAQ investigation method. Qualified individuals can proceed to the CMHC Residential Indoor Air Quality Investigator Training Program. Individuals who complete the training program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. As a private business, they offer their professional services to the public for a fee. Individuals interested in the program can contact Virginia Salares (e-mail vsalares@cmhc.ca, tel 613 748-2032, fax 613 748-2402), the training coordinator (e-mail: iaq22qai@magma.ca, telephone 819 827-3915) for admission requirements and application forms. Thirty individuals have received their completion diploma and fifty are in the field training phase. For referral purposes, a list of diploma graduates is available from CMHC offices.

CMHC Project Officer : *Virginia R Salares*
CIDN : 16230300
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Seminar/training is available

PENETRATION OF OUTDOOR PARTICLES INTO A RESIDENCE

The objectives of this study were to determine how ventilation and operational configurations can affect the indoor-outdoor relationship of fine particle concentrations in a home and to determine the filtration effect of the house envelope for incoming ventilation or infiltrating air.

The study was limited to one, southern Ontario Canadian home with moderate airtightness. The house was operated with normal occupancy of 2 adults and with 5 distinct ventilation modes as follows:

1) Supply Only, No Filtration
2) Exhaust Only, No Filtration
3) Balanced, No Filtration
4) Balanced, with HEPA Intake Filter
5) Supply Only, with HEPA Intake Filter

Ventilation rates ranged between 1.20 and 0.71 ACPH and were selected to ensure that in the Supply Only arrangements, all of the incoming air passed though the ventilation system and in the case of the Exhaust Only arrangement all of the incoming air passed through the building envelope. Continuous real-time measurement of indoor and outdoor particulate levels were made in 5 locations. Air temperature, air pressure, wind speed and ventilation flows were also measured continuously. A total of 428 data-hours were used for data-analysis.

The non-filtered ventilation arrangements resulted in higher indoor-outdoor ratios in both the PM1 (Particulate Matter less than 1Fm) and PM10 (Particulate Matter less than 10Fm) size ranges. Filtered ventilation arrangements resulted in significantly lower indoor-outdoor ratios. Exhaust only ventilation arrangements (incoming air filtered by the house envelope) resulted in ratios in the mid-range between the filtered and unfiltered ventilation cases.

Comparison of the data with a mass-balance model showed that, for a fixed rate of indoor particle generation/resuspension, there was poor correlation of measured and predicted particle levels for the filtered ventilation modes, but good correlation for the unfiltered ventilation modes. This probably occurs because the indoor particles in the filtered ventilation modes are dominated by indoor generation/re-suspension which is in fact quite variable. In the unfiltered cases however, the improved correlation of measured with predicted levels demonstrates that indoor levels are primarily a function of outdoor levels.

Further analysis of the data using the mass-balance model predicted filtration factors (removal rate of incoming particles) for the building envelope of 0.43 and 0.37 for the PM1 and PM10 size ranges respectively.

In general, it was found that there are substantial benefits to filtering the incoming ventilation air. The benefits of filtering appear to be only slightly reduced for balanced ventilation systems when compared to supply-only ventilation systems. Ventilation air which enters via the building envelope appears to experience a significant degree of filtration.

Prepared by Bowser Technical Inc. Principal Investigator: Dara Bowser. Prepared for Policy and Research Division. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003. Volume 1 Main Report (18 pages) Volume 2 Appendices (8 pages)

Note: No. 03-105 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

REDUCTION OF AIR INTAKE CONTAMINATION IN HIGH-RISE RESIDENTIAL BUILDINGS: FINAL REPORT

The purpose of this project was to evaluate the dispersion of pollutants from rooftop sources on high-rise buildings so that guidelines on the placement of stacks and air intake grilles for HVAC systems could be developed. The reingestion of building exhaust into fresh air intakes has been shown to adversely affect indoor air quality. Often the source of the contaminants is an adjacent building, which may or may not be a residential structure. Although a number of experimental studies have investigated the dispersion of exhaust from low-rise buildings, relatively little work has been conducted concerning high-rise buildings. This study provides some guidelines to building designers concerning the placement of fresh-air intakes on such buildings.

The placement evaluation was based on water flume tests and modeling of air movement around high-rise buildings given confounding factors such as the height and proximity of neighboring buildings. A literature survey of relevant research on air intake grille location and contamination potential was also undertaken.

Prepared by T. Stathopoulos, P. Saathoff and H. Yan. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 61 pages

Note: No. 03-119 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health. Health Canada, Carleton University and Natural Resources Canada are partners and are represented in the project advisory committee. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency.

INDOOR ENVIRONMENT

The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study is ongoing and expected to be completed in 2004.

CMHC Project Officer : *Virginia R Salares*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 2157 0200001
STATUS : Ongoing

RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by the Natural Sciences and Engineering Research Council (NSERC), Paracel Laboratories, Morrison Hershfield Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is underway.

CMHC Project Officer : *Virginia R Salares*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : N/A
STATUS : Ongoing

MANUFACTURED HOUSING

DEBUNKING THE MYTHS: LAND LEASE COMMUNITY DEVELOPMENT: A MUNICIPAL COST BENEFIT ANALYSIS

This study was undertaken by an industry association with the objective of identifying the potential of manufactured housing as a viable source of affordable housing. To date this option has not been widely adopted, in large part due to a combination of consumer reluctance and more particularly exclusionary planning and zoning policies that have limited the opportunity to utilize this relatively affordable housing form in many cities.

The goal of this study is to provide documented research which can be used by the industry, and various levels of government to build public confidence in the decisions made by public officials and professionals. The focus is to:

- dispel the myths that are often used by the public and government officials to prevent the development of manufactured home communities in Canada and
- provide a document that can help address ways to meet the increasing demand for affordable housing through revealing many of the advantages of this type of development.

The purpose of this research was to undertake a study of land lease housing communities that evaluates and documents the impact that this form of development has on municipal costs in order to promote the development of affordable housing through the use of manufactured homes. This is the final report on a socioeconomic analysis of the impact of manufactured home parks on the residents of the communities in which they are located.

Final report to Homegrown Solutions. Prepared by Ron Corbett and J. Frank Strain. For the Manufactured Housing Association of Alberta and Saskatchewan. Ottawa: Canada Mortgage and Housing Corporation, 2002. 22 pages.

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY-DETACHED CONSTRUCTION

This External Research project is studying the economic feasibility of using an automated, mobile plant to produce houses that are 90-95% complete when they leave the plant. The plant would be erected in the subdivision where the houses are to be built (with basement foundations pre-installed), and once the construction program is complete, the plant would be dismantled and shipped to the next locale. The final report has been received and is currently being reviewed. The project is expected to be completed by the end of 2003.

CMHC Project Officer : *Chris Ives*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 23050201
STATUS : Ongoing

MANUFACTURED HOME DESIGN AND LAND LEASE COMMUNITY PLANNING

The purpose of this project is to explore various innovations in land use, infrastructure and unit design in manufactured home land lease communities across Canada. The intention is to demonstrate that not only can land lease communities be leaders in infrastructure innovation as well as providers of high quality affordable housing, but that in any community when these issues are explored simultaneously, that savings from one area can offset extra costs in another. The first of several demonstrations which will make up this project will undertake and complete the design of a Tee or L shaped 'foldable' manufactured home with improved heat storage and thermal envelope and its related site planning, as well as initial planning and infrastructure investigations for future phases of a land lease community in Nova Scotia. Other projects will investigate two storey designs and the use of containerized infrastructure modules.

CMHC Project Officer : *Mark Holzman*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 24440200
STATUS : Ongoing

SERVICING THE SALE (MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM - PHASE III)

This partnered project between the Canadian Manufactured Housing Institute, CMHC and others will develop a new workshop module which will accompany CMHI's Manufactured Housing Consultant™ program. The module, a half-day interactive workshop focusing on "best practices" , will provide manufactured housing salespeople with the knowledge and tools to help them better serve consumers after the contract has been signed, i.e., throughout the construction, installation and move-in stages, as well as beyond. The module will be completed by mid 2004.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 3069-PLN03
STATUS : Ongoing
NEW

CLEANING UP YOUR HOUSE AFTER A FLOOD AND CLEAN-UP PROCEDURES FOR MOLD IN HOUSES

Two CMHC publications, "Cleaning Up Your House After a Flood" and "Clean-up Procedures for Mold in Houses", are undergoing revision. These documents have been widely used since 1993. The revision will incorporate the most up-to-date information on dealing with mold and provide steps for homeowners to follow in assessing and fixing the problem. The revision of "Clean-up Procedures for Mold in Houses" has been completed. The revision of "Cleaning Up Your House After a Flood" is expected by December 2003.

CMHC Project Officer : *Virginia R Salares* — ***CIDN*** : 24470200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS

CMHC is providing financial and technical support to NRC/IRC to develop guidelines for moisture management strategies for exterior wall systems. The guidelines will address user requirements for long-term performance and durability of wall systems for the wide range of climate zones across North America. The date for release of project information from this research consortium is unknown. NRC/IRC is commencing with a building science insight seminar which will be delivered across Canada during the fall and winter of 2003. The seminars are based on the work generated by the Mews (moisture management in external wall systems) project.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 21990200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

HYGROTHERMAL MODELING AND FIELD MONITORING OF BUILDING ENVELOPES - A COMPARATIVE STUDY

The objective of this project will be to compare predictions of various hygrothermal computer simulation models against the performance of actual field monitored exterior wall assemblies. Extensive benchmarking of these programs have been carried out in the laboratory settings with wall assemblies subjected to controlled environmental conditions. However, few of these computer models have been benchmarked against actual field data . This project will be key to bridging this knowledge gap. As an understanding of the moisture performance of exterior wall assemblies at the design stage is critical to the construction of durable residential buildings, this work will contribute to improving the integrity and reliability of building moisture management prediction tools which are increasingly being used by the residential building design community. This project is expected to be completed by end of 2004.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 27110200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HYGROTHERMAL MODELS FOR BUILDING ENVELOPE RETROFIT ANALYSIS

A project has been initiated to review the array of commercially available hygrothermal models to determine how appropriate they are for assessing the impact of building envelope retrofits on the hygrothermal performance of the retrofitted assemblies. The assessment will be based on the availability of the model, the cost, the degree to which it is supported, its ability to model the selected wall assemblies and retrofit strategies, the transparency of the algorithms and ease of use. Based on this review, the project's consultant will be responsible for recommending one, if not two, models that will be used in a subsequent research project to assess the impact of several insulation retrofit scenarios on five selected wall systems. This project will be completed by December 2003.

CMHC Project Officer : *Duncan Hill*	***CIDN*** : 24290200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

ICE DAMMING PHOTOS

It is possible that the patterns of ice or snow on residential roofs may be useful in predicting the house tendency to ice damming, or in the locating of the trouble spots. The goal of this project was to photograph roofs of houses in Winnipeg,Toronto, and Peterborough during periods of heavy frost or light snow, and to show the specific roof 'hot spots' or places with preferential melting. The initial work is complete with photos from all three sites. The completion of the project was to verify whether the houses with unusual roof melt patterns also experienced ice damming in those locations. However, none of these three cities has experienced ice damming conditions in the following two winters. The comparison of the melt patterns with the formation of ice dams will have to wait for more severe winter conditions, perhaps in 2003/2004.

CMHC Project Officer : *Don Fugler*	***CIDN*** : 21420200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

ICE DAMMING SOLUTIONS

CMHC has already undertaken research into the causes of ice damming. In this project, CMHC will investigate whether appropriate remedial measures will solve an existing ice dam condition. The contractor will test houses with ice damming problems at sites in different parts of the country. These houses have already had ice damming problems documented and recorded. Changes will be made to the roofs and attics, in order to reduce the possibility of ice damming, largely by lowering attic temperatures. However, it is difficult to prove success following remediation, unless a winter conducive to ice damming appears. The contractor will have to use temperature monitors to prove a significant difference between the remediated building and adjacent controls. If the remedial work is completed in the fall of 2003, a report will be available in mid-2004.

CMHC Project Officer : *Don Fugler*	***CIDN*** : 27680200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM

The objective of this project is to modify and upgrade WALLDRY, a computer program developed by CMHC, which models the flows of moisture, heat and air through wall assemblies; the response to given external climatic loads and interior temperature and humidity conditions. Project completion is expected by the summer of 2004.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25050200
STATUS : Ongoing

MOISTURE PROBLEMS IN SEASONALLY OCCUPIED HOUSING

This research will examine moisture issues of unoccupied houses. There are many dwelling types that do not have occupants for long periods of time. These would include houses where the homeowners go south for a large part of the winter, second houses, houses deserted for periods due to natural disasters, rental houses without occupants for extended periods, and cottages. Unoccupied houses often suffer moisture related damages to building materials, finishes, and house contents. In many cases, there should be simple ventilation solutions that will reduce or eliminate these moisture problems. This project will investigate the types of moisture problems found. The Nova Scotia contractor will analyze moisture sources and removal methods, and then recommend solutions for a variety of sample dwellings. The solutions will depend on whether the unoccupied spaces have electrical power, and functioning heating or ventilation systems. The research will take two full winter seasons and is planned to be complete in 2005.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 27070200
STATUS : Ongoing

MONITORING THE PERFORMANCE OF A RETROFITTED PRESERVED WOOD FOUNDATION

Homeowners in a house in the Ottawa area were experiencing sensitivity to moulds growing inside the wall cavities of their preserved or permanent wood foundation (PWF). CMHC became involved when the homeowners sought to resolve the moisture problems underlying that growth.

Based on the site description, the site inspection, and description of the problem, investigators felt that the main moisture source to the PWF was due to moisture movement through the bottom plate and the lower wall area. The proposed remedial solution was to continuously vent the bottom area of the wall cavity to the outside. The remaining, upper part of the wall cavity was re-insulated with cellulose fill. Two interior wall finishes were tried: unpainted drywall (with no polyethylene) and polyethylene with no drywall.

Ten monitoring stations were established around the perimeter of the foundation to monitor relative humidity moisture content in the lumber framing, temperatures at various positions in the wall, and the moisture content in the plywood in the upper portion of the wall. Mapping of the pressures in the wall cavities was undertaken to assess the source of make-up air. Flow measurements in the ventilated cavity and the exhaust stream were also made.

This report describes the basis for the renovation solution that was installed and the monitoring that was done to confirm the effectiveness of the recommended solution.

Prepared by Donald Onysko, Dan Gates, Gerard Van Rijn. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2003. 51 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

TESTING THE EFFECTIVENESS OF CLEANING TO REDUCE EXPOSURES OF OCCUPANTS TO MOLD

This study proposes to test the effectiveness of thorough and regular routine cleaning of moldy houses in reducing occupant's exposure to mold. The pilot phase of the study on two houses was completed this past winter. The results of the pilot will be used to develop the methodology (cleaning procedure, frequency of cleaning, field measurements) to be used for the second phase. Since measurements are best done during the winter season, the next phase will be conducted in late 2003 to early 2004.

CMHC Project Officer : *Virginia R Salares*	**CIDN** : 24480200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

WATER PENETRATION TESTING ON WALL SYSTEMS

There is an overall lack of good, qualitative data to compare the drainage characteristics of various claddings, drainage cavity configurations and building materials in wall assemblies. In some jurisdictions across Canada, rainscreen or cavity wall construction will be required (mandated) to manage the expected exterior moisture loads; the City of Vancouver Building By-laws have already mandated the use of rainscreen wall systems. Many new products have been introduced into the marketplace in recent years, which claim to promote and/or improve drainage characteristics and drainage performance of wall systems . However, the actual performance of these products has not been fully evaluated or understood. The objective of this project is to perform laboratory tests to investigate how effectively different drainage cavity configurations (including drainage media) are able to drain water or retain water within the cavity space. This project is expected to be completed at the end of 2004.

CMHC Project Officer : *Silvio Plescia*	**CIDN** : 25620200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

WIND-RAIN RELATIONSHIPS IN SOUTH-WESTERN BRITISH COLUMBIA

Moisture is one of the important factors affecting the durability, utility and aesthetics of the building enclosure. Rain, particularly wind-driven rain, is often one of the largest contributors to the overall moisture load the envelope experiences, especially in Canada's coastal regions. The objective of this pilot project will be to analyze climate data for numerous stations in southwestern BC (including Vancouver Island) in order to develop a better understanding of the wind and rain relationships. These include wind speed and direction, with and without coincident periods of rain, and the monthly and seasonal variations in those relationships. The research will relate the weather information (rainfall) to the potential impact on the building enclosure (ie. rain intensity). This project is expected to be completed by the fall of 2004.

CMHC Project Officer : *Silvio Plescia*	**CIDN** : 3085-PLN03
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

NORTHERN HOUSING

COMPARISON OF NORTHERN HOUSING COSTS

This project deals with the development of a housing cost database for the North. This database includes every community in Labrador, Nunavik, Nunavut, NWT and Yukon. Using the Department of Public Works and Government Services National Master Specifications, this database outlines all components associated with the production of a Northern home—from soft to hard, at both the house level and community level to determine which elements, in which locations are inordinately skewing costs. Through use of index communities (the shipping points of Edmonton, Winnipeg and Montréal), it permits comparison of housing costs from North to North, and from North to South. Launched in 2002, it will be annually updated. The operationalized database will permit future tracking and analysis such as life cycle performance costs; where use of local labour, indigenous materials and value-added processing of raw, local materials can be developed or expanded to reduce housing costs; and where capacity building may be beneficial. In 2002, much empirical data was not available, and statistically valid measures were used to calculate incomplete data. Over the next several years, through annual data collection, enough "hard" data will be entered to allow users to work from entirely real data. In 2004, the Excel spreadsheets can be downloaded and the user can manipulate the data for their own uses.

CMHC Project Officer : *Grant Morrison*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 23700200

STATUS : Ongoing

NEW

PROPERTY MANAGEMENT

OPERATIONS MANUAL FOR MAINTENANCE AND CUSTODIAL STAFF OF MULTI-UNIT RESIDENTIAL BUILDINGS

Canada Mortgage and Housing Corporation developed this manual as a service to property owners and managers of multi-unit residential buildings, in cooperation with the Canadian Condominium Institute, and the Association of Condominium Managers of Ontario.

The information contained in this manual provides helpful direction for maintenance and custodial staff to improve the overall performance of apartment buildings in terms of durability and occupant health and safety. The purpose of this manual is to provide the maintenance and custodial staff of multi-unit residential buildings with the following information:

1. Guidance to perform daily, weekly, monthly, and annual tasks.
2. Information to help diagnose problems within the building.
3. Guidance to perform minor repairs and preventative maintenance.
4. Guidelines indicating when outside contractors and engineers are required.
5. Dealing with tenant concerns.

The information is organized in the following sections: housekeeping; grounds keeping; building envelope; electrical, lighting, motors, and appliances; fire protection; plumbing and drainage; heating, cooling and other mechanical systems; and security and communication.

By adopting the operating practices recommended by this manual, the maintenance and custodial staff of multi-unit residential buildings will ensure the buildings under their care will operate efficiently and cost effectively.

Prepared by Efficiency Engineering Incorporated. Ottawa: Canada Mortgage and Housing Corporation, 2003. 196 pages

Note : Aussi disponible en français sous le titre : Manuel d'entretien à l'intention du personnel d'entretien et de garde : collectifs d'habitation

STATUS : Completed Report *Order no. 63085*

AVAILABILITY : CMHC Information Products

OPERATIONS MANUAL FOR OWNERS AND MANAGERS OF MULTI-UNIT RESIDENTIAL BUILDINGS

Canada Mortgage and Housing Corporation developed this manual in cooperation with the Canadian Condominium Institute, and the Association of Condominium Managers and Operators to assist property owners and managers of multi-unit residential buildings. Its purpose is to reduce the cost of operating multi-unit residential buildings, improve the overall affordability and to sustain the stock of apartment buildings in Canada.

While much of the information contained within this manual is directed at reducing costs, it also provides helpful direction for improving the overall performance of apartment buildings in terms of durability and occupant health and safety. This Manual provides owners and managers with the tools to tailor a cost-effective and successful management system for any multi-residential building. The process described in this manual will guide the owner/manager in:

1. Creating an operation and energy management plan. A building-specific set of documents to guide staffing, manpower and task planning, contracting, tenant management, budgeting, fire and life safety essentials, and utility management.
2. Making resource decisions concerning on-site staff or outside contractors.
3. Creating an organized filing system.

By adopting the operating practices recommended by this manual, the property owners and managers of multi-unit residential buildings will ensure that their buildings operate as long-term financial assets rather than liabilities.

Prepared by Efficiency Engineering Incorporated. Ottawa: Canada Mortgage and Housing Corporation, 2003. 211 pages

Note : Aussi disponible en français sous le titre : Manuel des opérations à l'intention des propriétaires et des gestionnaires : collectifs d'habitation

STATUS : Completed Report *Order no. 63078*

AVAILABILITY : CMHC Information Products

TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS

This project, funded by Canada Mortgage and Housing Corporation in partnership with the Real Estate Institute of Canada, aims to develop a course for property managers on the technical audit of high-rise residential buildings. Using a building as a system approach, this course will provide property managers and building owners with a perspective of the interaction of all building systems and components. Such training is not available to residential property managers in Canada. Technical audits, an organized review of building systems, are an effective way to assess the condition of a building, to understand how the building is performing and to provide a sound basis for making maintenance, repair and upgrade decisions. The course provides the property manager with insights into the technical audit process and highlights the requirements for undertaking technical audits of residential buildings including the scope of the work and the consultant qualifications. The course also introduces the fundamental principles of building science to encourage holistic solutions to building problems. The course documents are completed and delivery will begin in summer 2003.

STATUS : Completed

AVAILABILITY : Seminar/Training available

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE PHASE II

The overall objective of this multiphased Canadian Home Inspector and Building Official (CHIBO) national initiative is to raise the level of competency of the private home inspection industry and the municipal building officials, and establish a qualified and recognizable industry to better serve their clients. Phase I activities resulted in the development of Occupational Standards for each of the two inspection sectors. Phase II will build on the results of the first phase and will develop a Certification/Accreditation model for both sectors of the inspection industry. The First Nations National Building Officer's Association has joined CHIBO Phase II and will use the results to adapt one of these models for their own members use. Phase II is about to start and should be completed by fall 2004. The certification and accreditation models are anticipated to be implemented by industry in 2005.

CMHC Project Officer : *Darrel Smith* — ***CIDN*** : 25150200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : There will be no product for this project

INVESTIGATION OF CLAIMS AGAINST PRIVATE HOME INSPECTORS TO DETERMINE THE INCIDENCE AND TYPE OF UNREPORTED DEFECTS

The purpose of this research is to investigate legal claims made against home inspectors and determine from those which were found in favor of the plaintiff and identify the most common incidents of unreported defects. It will also look for and identify any regional trends. As part of this same research the contractor will also research the effectiveness of the various disclaimer clauses currently in use by industry practitioners and recommend one which is most effective, appropriate, and fair for all parties. This research will be completed in the fall of 2003 followed by a research report available early in 2004.

CMHC Project Officer : *Darrel Smith* — ***CIDN*** : 30670200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MANDATORY HOME INSPECTIONS ON RESALE HOMES IN ONTARIO

A CMHC External Research Program (ERP) grant was awarded to research the issue of mandatory home inspections for resale homes in Ontario with a number of housing industry interest groups such as Ontario Government stakeholders, the inspection industry (public and private), the real estate industry, financial lending institutions, and consumer associations. The research investigated was to determine why this requirement was never imposed in the past, the pros and cons of enacting such a requirement in the future, and how could such a requirement be enacted and by whom. The study also investigated if the existing home inspection industry could handle the increased capacity of such a requirement. The research indicates that all industry interest groups agree that home inspections are a worthwhile part of the resale home process. They also believe that a voluntary inspection service is adequate, provided the industry self-regulates and establishes uniform acceptable standards of practice to provide a better service for homeowners.

Prepared by Terry A. Marshall. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2002 (CMHC External Research Program Report) 84 pages

Note : No. 03-101 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

NEW HOME PRE-DELIVERY INSPECTION PROTOCOL FOR PRIVATE HOME INSPECTORS

This work contributes to CMHC's and industry's efforts to raise the competency of the private home inspection industry. The purpose of this project is to research and develop a pre-delivery inspection (PDI) protocol which the private home inspection industry can use as a tool to perform an adequate pre-delivery inspection of a new house. With the aid of the inspection protocol, the home inspector would verify that the systems and components are functioning properly and as intended, and that the house has been constructed as per the plans and specifications. Currently, PDIs may be conducted to informal or inadequate protocols which can vary considerably in their scope and effectiveness. The result may be problematic for all parties involved in the new home delivery process. The pre-delivery inspection protocol will be developed in concert with the affected key stakeholders such as private home inspectors, builders, warranty program, real estate lawyers, and consumers. The generic PDI protocol developed will be presented in a CMHC Research Report expected early in 2004.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28170200
STATUS : Ongoing

RECYCLE: LIFECYCLE - HOW TO RENOVATE FOR CHANGE

This project's purpose was to develop a set of design strategies for adaptable renovations involving a variety of common, detached housing types. The objective of these strategies was to inform homeowners, or prospective homeowners about how they could, through alterations or additions to their homes, achieve the greatest flexibility while meeting their changing needs. It is intended for use by homeowners, architects and home designers, contractors and others in positions of jurisdictional authority.

Prepared by Elizabeth MacKenzie, James Boldt, Linda Brock. CMHC Project Officer: Tom Parker. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 49 pages

Note: No. 03-007 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

RENOQUALITY WORKSHOP-STRATEGIES TO ADDRESS EXISTING HOUSING IN CANADA

This workshop which was held in Toronto by RenoQuality, brought together, from across the country, leaders from a wide variety of industry, government, educators and voluntary sector organizations to generate the best ideas for addressing issues regarding existing housing - issues such as renovator certification and training programs, warranties, and financing. This was a multi-partnered project with participation including Natural Resources Canada, RenoQuality, Enbridge Consumers Gas, Ontario Power Generation, and CMHC. The insights gained at this workshop will be used to determine the logistical requirements/feasibility of developing a national training program, financing options and warranty products through a new nationally coordinated organization. It will also set the foundation to build and strengthen multi-stakeholder commitment and alliances for implementing possible outreach strategies. For more information on this project contact Ian Morton from RenoQuality at (416) 922-9038 Ext. 26.

STATUS : Completed
AVAILABILITY : There will be no product for this project

RENOVATING DISTINCTIVE HOMES: THE CENTURY HOME

This book focuses specifically on the century-old two storey house. With the century-old two storey house, the layout, the construction methods and systems of the period, and the usable attic all pose particular renovation opportunities. This book provides the homeowner with information to plan and carry out successful renovation, and recognizes the typical problems houses of this vintage face. It includes technical information as well as what to ask your contractor and how to incorporate Healthy Housing™ and FlexHousing™ features into renovation plans. It includes the following:

- background information on why the century-old two storey house is built the way it is
- typical problems century-old houses face and what needs attention as part of any renovation
- an overview of what a renovation project involves
- tools to help plan and carry out a renovation: worksheets, checklists and a sample renovation contract
- renovation ideas and tips on proper construction details of typical renovation projects
- a directory of further information sources.

Prepared by Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2003. 123 pages
Order number 63106 Price: $14.95 + GST + Handling Charges

Note: Aussi disponible en français sous le titre : La maison réinventée : La maison centenaire

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

DEVELOP A SET OF ENVIRONMENTALLY SUSTAINABLE SITE AND BUILDING DESIGN, CONSTRUCTION AND OPERATION GUIDELINES FOR SINGLE AND MULTI-FAMILY UNIT HOUSING, MOTELS AND HOTELS FOR THE TOWN OF BANFF

The purpose of this project is to develop a set of environmentally sustainable site and building design, construction and operation guidelines for single and multi-family unit housing, motels and hotels for the Town of Banff in a manner which could be used to inform the development of similar guidelines for other communities across Canada.

CMHC Project Officer : *Mark Holzman*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 23090200
STATUS : Ongoing

INTEGRATED COMMUNITY SOLUTIONS: REGINA'S AFFORDABLE, SUSTAINABLE HOUSING DESIGN CHARRETTE

A design charrette sponsored by Canada Mortgage and Housing Corporation (CMHC) and hosted by the City of Regina took place on January 10, 2003. The purpose was to solicit ideas and explore the opportunities for a pilot project that would demonstrate affordable, sustainable housing development on a vacant school site located in Regina's inner city based on initial design and feasibility work for the site.

Design charrettes are becoming more common in design practice and are an excellent way to bring a range of expertise and interests together to collaborate and create effective solutions to multifaceted projects. The Regina Affordable Sustainable Housing Charrette was very successful in presenting a vision and potential path towards creating healthy affordable housing and a community asset for the City of Regina.

The project goal was to create design strategies that can reduce operating costs while providing comfortable housing that protects the health of the occupants and the environment. Thirty-five key individuals contributed their expertise and time over an intensive day of presentations and discussion. They included technical experts, representatives from the local neighbourhood, and participants from various partner organizations.

The degree of enthusiasm and positive ideas as well as the degree of consensus achieved during the charrette reflect the shared realization of the participants for the extensive benefits that such a well-planned healthy housing project could bring to the housing occupants, as well as the surrounding neighbourhood.

Prepared by Ken Coutu, Integrated Controls Ltd. Prepared for: Community Services Department, City of Regina and Policy and Research Division, Canada Mortgage and Housing. Corporation. City of Regina Project Manager: Robert Bjerke. CMHC Project Manager: Thomas Green. Ottawa: CMHC, 2003. 81 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

INTEGRATED DESIGN CHARRETTE FOR A SUSTAINABLE UNIVERCITY COMMUNITY: CHARRETTE RESULTS, BURNABY, B.C.

In order to support the development teams in the design of a new, more sustainable residential development at Simon Fraser University, known as the UniverCity Community, an integrated design charrette was initiated in September 2002. The charrette took place over two days at Simon Fraser University in Burnaby on September 9 and 10, 2002. The intention of the Charrette was to use the integrated design process (IDP) to push the boundaries of building performance towards more sustainable practices.

The objective of the Charrette was to provide participants with the tools and information required to make it easier to implement the Green Building Guidelines established for the UniverCity Community. The sessions were intended to take development teams working on the first stage of the UniverCity Highlands project through an integrated design process. Experts with experience in the integrated design process acted as facilitators and provided support to the design teams. Resource persons were selected to provide specific areas of expertise that would complement the composition of the design teams and enable the integrated design process in each team to become more specific and less theoretical. The charrette helped development teams attain meaningful progress towards the UniverCity development's sustainability goals. This report describes the integrated design process, the work of the charrette teams, the break out sessions, and the conclusions reached.

Prepared by Richard Kadulski, Architect. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2003. 43 pages

Note: No. 03-110 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Available on a loan basis only from the Canadian Housing Information Centre

INTEGRATED DESIGN PROCESS (IDP) DESCRIPTION AND EVALUATION FINAL REPORT: SEVILLE THEATER REDEVELOPMENT PROJECT

This report describes the results of an integrated design process carried out for the Seville Theatre Redevelopment Project in Montreal. The purpose of the charrette was to validate the economic potential in creating and building an innovative concept that is predominantly environmentally sound. This charrette distinguished itself from previous ones by its inclusion of a wider range of concerns beyond energy efficiency: urban integration, commercial operation requirements and the questioning of the program itself, recycling of existing buildings and heritage issues, embodied energy and greenhouse gas emissions as well as urban ecology. With respect to building energy performance, the discussion was similarly widened to include a number of technologies which have not yet been widely applied in the Canadian context yet, such as underground earth pipes and double-skin ventilated walls/facades. This final report provides the context for the charrette, describes the integrated design process that took place, and outlines results and comments from the post-charrette evaluation. Appendices include pre- and post-charrette designs, and participant papers and reports.

Written and edited by Daniel Pearl and Bernard Olivier of L'OEUF. Montreal: L'OEUF (Pearl Poddubiuk architectes), 2002. ca. 153 pages

STATUS : Completed Report

AVAILABILITY : Available from: L'OEUF (Pearl Poddubiuk architectes) 995 Girouard, Montréal, (Québec) H4A 3B9 www.loeuf.com

INTEGRATION OF NEW GREEN TECHNOLOGIES IN MULTI-UNIT RESIDENTIAL BUILDINGS

This is a multi-year project in co-operation with the Program for Energy Research And Development (PERD) initiative. The technique of Integrated Design Charrettes is being used to introduce new green building concepts and challenge designers to integrate these technologies into residential buildings. The charrette is intended as a technical transfer tool and to introduce the benefits of this process to building professionals. The team members are not just drawn form the usual design team, but include expertise from other diverse fields, such as environmental consultants, property managers, envelope, acoustics and costing experts. The members of the charrette teams provide different viewpoints and stimulate new ways of thinking towards common sustainable goals. Working together simultaneously, they can achieve higher performance and value-added developments. Integrated Design Charrettes have been and will be organized in different cities across Canada:

Montreal - Support was provided to an integrated design charrette for an innovative retrofit project led by NRCan. The project explored many sustainable features such as double façades and daylighting opportunities, using computer simulations to determine their potential benefits and cost feasibility. See abstract above.

Burnaby - This integrated design workshop was organized with UniverCity Community development at Simon Fraser University. Three design teams with facilitators, energy simulators, cost surveyors, and sustainable building expertise worked together over two days to improve the sustainable features of their building designs. See abstract on page 67.

Calgary - To inform participants of the workshop of the latest research, technologies and practices for the design of sustainable and durable residential buildings. Specialist and diverse design expertise, actively participate in the integrated design teams in the design charrette of affordable housing on the Heritage/McLeod site in Calgary.

Edmonton - This workshop will engage the City of Edmonton, developers, planners and design team members in exploring sustainable design techniques on a new development site.

STATUS : Completed

AVAILABILITY : Product is not yet on the web

RESIDENTIAL DAYLIGHTING GUIDELINES FOR SUSTAINABLE COMMUNITY DESIGN

Past research has identified that improved daylight access in housing can provide multiple benefits such as reduced energy consumption, improved health and the potential for solar energy applications. The obstacle to these benefits is a lack of knowledge and clear guidelines on proper building design for daylighting and solar access. This project will quantify and qualify the benefits of improved daylighting in housing and analyze the impact of housing form, density and layout on daylight availability and solar access. The result will be the development of sustainable community design guidelines, planning criteria and targets to provide for viable daylighting and solar access to various typical housing forms, geographic locations, and urban situations in Canada. A Request for Proposal will be issued.

CMHC Project Officer : *Thomas Green*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25390200
STATUS : Ongoing

TAP THE SUN WORKSHOPS ON PASSIVE SOLAR HOME DESIGN

This project involves preparation for hosting a national series of 1-day workshops on passive solar house design based on the CMHC information product Tap the Sun, and targeted to building and design professionals. Increasing concern about energy costs and attention to climate change issues is generating considerable interest in passive solar home design and the use of nonpolluting renewable energy sources. In this project, a previously developed CMHC pilot workshop on passive solar home design will be further developed and refined, and a delivery plan and process will be established. Delivery of an initial workshop is expected in late 2004.

CMHC Project Officer : *Thomas Green*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : N/A
STATUS : Ongoing

TAP THE SUN: REVISION AND UPDATE

This project will revise and update the CMHC Tap the Sun publication and CD-ROM. Tap the Sun acts as a primer on passive solar design, presenting passive solar techniques and Canadian home designs. The revised Tap the Sun product will include important data updates, a wider selection of case study projects, more detailed key resources, and improvements to the integrated tools such as the Comfort Design Checker and the window products design database. As well, the related CD-ROM may include other related software tools such as the RETScreen Solar Heating Module by NRCan. The revised product should be available in fall 2004.

CMHC Project Officer : *Thomas Green*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25450200
STATUS : Ongoing

CASE STUDIES OF ON-SITE STORMWATER MANAGEMENT ALTERNATIVES: FINAL REPORT

This report provides practical information to developers, landscape architects, and municipalities to promote stormwater best management practices (BMPs) at the level of the individual lot or a cluster of buildings. It examines the costs and benefits of practical solutions as well as any barriers to implementation through a series of case studies.

Specifically, the study:

- documents case studies of lot- and cluster- level stormwater BMPs, including documentation of their key economic, technical, and implementation issues; and
- lists the key economic, technical, and implementation issues of other potential BMPs where relevant case studies are unavailable in Canada.

Other topics covered within the report include:

- an overview of key stormwater management issues.
- traditional stormwater management financing options.
- alternative lot- and cluster- level stormwater best management practices.
- a high-level overview of BMP functions, and
- descriptions of the ten stormwater best management practices, as well as effectiveness and economic analyses, and a discussion of implementation issues.

Prepared by Hagler Bailly Canada with Marshall Macklin Monaghan. CMHC Project Officer: Cate Soroczan. Ottawa: Canada Mortgage and Housing Corporation, 2000. 57 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

COMPARISON OF COSTS FOR NORTHERN WATER AND WASTEWATER INFRASTRUCTURE: CONVENTIONAL VS. ALTERNATIVE SERVICING

A cost comparison for conventional water and sewer infrastructure vs. alternative systems will be conducted for various regions in the North. It is anticipated that 5-8 communities will be included in the project in order to represent the variety of factors affecting water and sewer costs in the North e.g. supply location, source quality, geographic location, delivery mechanism, availability of wastewater services and operation and maintenance costs. The results of this work will serve to provide concrete costs related to the provision of water and sewer services. A revised draft final report is expected in October 2003.

CMHC Project Officer : *Catherine Soroczan*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 28050200

STATUS : Ongoing

DUAL-FLUSH TOILET PROJECT

CMHC, in partnership with 12 municipalities across Canada, conducted a pilot program to test dual-flush toilet technology in residential, commercial and institutional settings. Dual-flush toilet technology allows the user to select a short flush (three litres) or long flush (six litres).

This study monitored water consumption, toilet performance and customer satisfaction with the dual-flush system. Moreover, a small number of single-flush 6-litre toilets were assessed as a comparison. The project had three objectives:

1. to determine public perception, acceptance and satisfaction with dual-flush toilets

2. to field-test the performance of dual-flush toilets compared to 6-litre and 13-litre toilets in terms of consumption rates and equipment performance
3. to determine the cost-effectiveness of dual-flush toilets compared to 6-litre and 13-litre toilets.

Prepared by Veritec Consulting Inc. in association with Canada Mortgage and Housing Corporation ... et al. Ottawa: Canada Mortgage and Housing Corporation, 2002. 39 pages

Note 1: Aussi disponible en français sous le titre : Étude sur les toilettes à double chasse

Note 2. No. 02-124 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report *Order no. 63042* and Research Highlight
AVAILABILITY : CMHC Information Products

INVESTIGATION INTO GERMAN RAINWATER CISTERN LEGISLATION, INCENTIVES AND CASE STUDIES

The purpose of this project was to find the appropriate agencies and contacts within Germany regarding rainwater cistern issues, and to document information related to rain water cistern use within Germany. A similar report on cistern issues within France and Belgium has now been completed in draft form. A Research Highlight on the two draft reports is anticipated for December 2003.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 20870200
STATUS : Ongoing

MAXIMUM DAY WATERING DEMAND PHASE II - ASSESSMENT OF WATER CONSERVATION STRATEGIES

This project's objective is to determine the impact of CMHC's Household Guide to Water Efficiency on indoor and outdoor water consumption. Specifically it will seek to address the questions: Is the impact on consumer behaviour maintained in the long term? What effect does the Guide have on outdoor water use during the summer months? What extra impact does a complementary social marketing campaign have on consumer behaviour? This work is part of the second phase of the Max Day project initiated in 2000, which saw a reduction in consumption rates based on conservation method used. The widely fluctuating irrigation demands during the summer of 2001 made it difficult to accurately assess the effectiveness of the Guide. A follow-up analysis was undertaken during the summer of 2002.

A draft final report has been received and a highlight is currently being written to summarize the various reports into one. This highlight will be available in December 2003.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 23410200
STATUS : Ongoing

REMOTE MONITORING AND CONTROL OF ON-SITE WASTEWATER TREATMENT, RECYCLING AND RE-USE SYSTEMS

Current and potential applications of remote monitoring and control include:

- conventional on-site systems, which have no mechanical or electrical components, provide treatment in a septic tank, possibly in a sand filter, and in native soil, discharge treated effluent to groundwater, and require minimal maintenance and no control;
- on-site systems for more difficult lot conditions, which can also include pumps and additional treatment components, may include more sophisticated systems for subsurface disposal, or use surface disposal, and require additional maintenance and control;
- recycling and reuse systems, which are being developed and applied in situations where the water demand, and the quantity and quality of effluent for on-site disposal, are important issues, and include treatment components that require performance monitoring and control.

Even the simplest of these systems, if not properly used and maintained, can fail, and more complex systems cannot be expected to operate reliably and effectively without periodic or continuous monitoring and control.

Examples of a variety of sensing, recording, monitoring, and communication technologies that have been applied to such systems have been described in papers, reports, and commercial publications. But no single non-commercial document exists to guide planners, designers, managers, and regulators as to the capabilities, limitations, opportunities, and benefits associated with options for remote monitoring and control of systems for on-site wastewater treatment, recycling, and reuse. This report is intended to address that need.

This report includes consideration of:

- Systems and system components currently in use, and alternatives presented by new and emerging technologies.
- Systems appropriate to a single on-site wastewater system, and those suitable for a network of many on-site units.
- Systems appropriate for a range of systems from simple passive conventional on-site systems to complex recycling and reuse systems.

The report begins with an overview of the role of remote monitoring and control in the management of on-site treatment, recycling, and reuse systems. It continues with an introduction to the fundamentals of remote monitoring and control and a review of system operating and water quality parameters that are, or could be, the subject of remote monitoring and control. This discussion is followed by case studies developed in consultation with individuals and organizations with responsibilities related to the case study systems. Appendices provide additional information about products and product sources.

Prepared by D.H. Waller, C. MacInnis, J. London, G.M. Bauer, Centre for Water Resources Studies, Faculty of Engineering, Dalhousie University. CMHC Project Officer: Cate Soroczan. Ottawa: Canada Mortgage and Housing Corporation, 2003. (CMHC External Research Program Report) 96 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

SAFE EFFLUENT WASTEWATER RECOVERY SYSTEM (SEWRS)

This project will monitor the performance of three greywater planter systems designed for single family homes over a 2 year period. Monitoring is scheduled to commence in October, 2003. Information on alternative greywater treatment systems within Canada and abroad will also be presented in the final report, due March 2006.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24370212
STATUS : Ongoing

TESTING PROTOCOL FOR ALTERNATE RESIDENTIAL WASTEWATER TREATMENT TECHNOLOGIES FOR RECLAIMED WATER - SURVEY OF WATER REUSE STANDARDS PHASE

CMHC has initiated work to create a multi-level draft guideline for residential water effluent quality based on reclaimed water application (e.g. toilet reuse, irrigation, etc.). A draft protocol is also being produced for the performance evaluation of near-commercially available, proprietary technology which provide reclaimed wastewater for residential reuse. Preliminary work has been undertaken to assess the state of "what is" in terms of guidance for water reuse applications and treatment system verification across the globe. This work formed the basis of discussion for a one day workshop of key stakeholders representing regional, provincial and federal agencies from across the country. The results of these discussions have been incorporated into a draft report submitted to CMHC. This draft will be disseminated to the workshop steering committee for review and comment by November 2003. The expectation is that the resulting guidelines and evaluation protocol, seen as impartial and not unduly influenced by vested interests, could then serve as a foundation for creation of a national standard for evaluating and certifying these systems for re-use.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 27960200
STATUS : Ongoing

WATER EFFICIENCY CASE STUDIES

Five case studies of municipal water efficiency initiatives undertaken across Canada have been documented. Details are provided regarding: the water conservation initiative(s), the costs, and results in terms of water savings. The results of this work were recently presented at the December 2002 Canadian Water and Waste Water Association (CWWA) conference in Toronto. The case studies will be posted on CMHC's web site on a monthly basis starting May 2003. It is anticipated that further case studies will be sought out and documented during 2003.

STATUS : Completed
AVAILABILITY : Product is not yet on the web

SOCIO ECONOMIC RESEARCH

ADAPTATION OF POTENTIAL HOUSING DEMAND MODEL TO ABORIGINAL COMMUNITIES - AN EXAMPLE

This study will build on the results of a feasibility study that looked at the application of CMHC's potential housing demand model in Aboriginal communities. It will take the recommended actions and apply them to a test case of the Nishnawbe Aski Nations (NAN), a grouping of 49 bands in Northern Ontario. Some specific tasks will be: to monitor the degree of difficulty that NAN administrators encounter in gathering accurate input data; and to refine the assumptions on headship rates and household types that will be parameters for the model. Eight communities from NAN will be piloted in a first phase, and if successful, the other communities will follow as Phase 2.

CMHC Project Officer : *Phil Deacon* **CIDN** : N/A

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

ALTERNATE ABORIGINAL TRAINING DELIVERY OPTIONS

Past experience has shown that there is a need to explore alternate approaches to delivering training to First Nations (FN) and other Aboriginal communities. A current study that is looking at the feasibility for these communities to share training expertise and resources has identified a number of promising approaches that could supplement some current approaches. The objective of this research is to examine promising approaches to sharing training expertise and resources, how logistics could work, and the sort of pay backs that the trainer or "training community" could expect. It is hoped that the results of this research will point to new directions which might provide for a more efficient use of available resources and support capacity development.

CMHC Project Officer : *Marcelle M Gareau* **CIDN** : 01PLO-8426

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

EFFECTS OF URBAN ABORIGINAL RESIDENTIAL MOBILITY AND SERVICE PROVISION

This research explored the effects of urban Aboriginal residential mobility on agencies that provide social services to Aboriginal people, and their clients in two Canadian cities where proportions of Aboriginal people are high - Regina, Saskatchewan and Winnipeg, Manitoba.

NOTE: No. 114 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

CMHC Project Officer : *Marcelle M Gareau* **CIDN** : 2436 0200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Research highlight is available

EXAMINING INUIT SPACE USE IN EURO-CANADIAN HOUSE FORMS

This project is intended as the initial phase of a long-term investigation of Inuit spatial behaviour in Euro-Canadian type housing. The main objective is to find out whether this type of housing is meeting the needs and preferences of users.

CMHC Project Officer : *Marcelle M Gareau* **CIDN** : 24370209

Division : External Research Program ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

EXPLORATION OF HOUSING OPTIONS FOR ABORIGINAL PEOPLE IN EDMONTON AND WINNIPEG

As a first step to predict what housing will be needed in the future for Aboriginal people, and what strategies could be implemented to better address Aboriginal housing needs, this research will examine the housing situation of Aboriginal people in Winnipeg and Edmonton. It will look at the characteristics of the housing stock occupied by Aboriginal people; explore the types of housing options that Aboriginal people need and prefer; and examine how various forms of home ownership can become more widely spread among Aboriginal people.

CMHC Project Officer : *Marcelle M Gareau*
CIDN : 26730200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

FEASIBILITY OF COMMUNITY RISK MANAGEMENT AS A SUBJECT FOR CAPACITY BUILDING IN ABORIGINAL COMMUNITIES

The objective of this project is to ascertain what are the components of risk management that are relevant in an Aboriginal community context, and to assess these against pragmatic criteria (as to whether the components can be taught in a capacity development environment & carried out by a typical Aboriginal community). The following tasks are envisaged: to review text and existing course materials; to determine what materials are relevant; to carry out interviews with risk management professionals & institutes, practitioners, CMHC, INAC & other capacity development personnel & Aboriginal groups; to do analysis; and to make recommendations for course content & training methods.

CMHC Project Officer : *Ed Nera*
CIDN : 24280200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HABITAT AUTOCHTONE ET LE GENRE : UNE APPROCHE SENSIBLE DE LA POPULATION CRIE DE CHISASIBI: RAPPORT FINAL DE RECHERCHE

Cree communities in Northern Quebec have undergone significant change since the first Euro-Canadians arrived on their land. Their traditions, houses and dietary habits have been profoundly influenced by the Western way of life. This study was conducted in the Village of Chisasibi, which was planned in 1980 on the basis of a new urban framework and new, fully equipped houses.

Traditionally, Native women and Cree women, in particular, have played an important role in the lives of their communities. Following the European conquest of Canada, Native women lost their status and were no longer consulted in the planning of their houses. Nonetheless, they were still responsible for domestic tasks, the upbringing of their children and the maintenance of the cultural identity of their communities.

The first part of the study deals with the women's opinions of the physical and functional aspects of their housing. The second part examines the experiences of the traditional lives of residents before they were integrated into the North American lifestyle. The results of this study, which involved about 40 women, revealed a considerable gap between living habits, residents' needs and existing housing. Hunting activities, extended families, early pregnancies and extreme weather conditions are some of the specific aspects of Cree culture. However, none of these aspects have been taken into account in the design of units and the materials used over the past 20 years.

The study revealed that new layouts designed by the residents did take some of the aforementioned cultural parameters into account. However, it is still essential that the traditions and needs of Native residents be taken into account when designing new units and that due consideration be given to rapid economic development and the social and cultural transformations of the Cree.

Prepared by V. Bhatt and M. Chagny. CMHC Project Officer: Phuong-Diep Nguyen. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 124 pages.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

INTER CULTURAL COMMUNICATION OF CMHC INFORMATION PRODUCTS: FINAL REPORT

In commissioning the Inter Cultural Communication of CMHC Information Products Project, CMHC undertook a proactive initiative designed to develop criteria to assess the applicability and relevance of its information products to Aboriginal target audiences.

CMHC recognizes that the availability of relevant and culturally appropriate housing information with regards to an array of housing matters, including management, construction, repairs, capacity building, and training is of growing importance. Yet, CMHC research to date indicates that many of its publications are not currently relevant to Aboriginal people.

Where materials have been specifically geared towards Aboriginal people, they have been very successful in reaching the intended audience(s). Consequently, CMHC sought to embark on the Inter Cultural Communication of CMHC Information Products Project to create an Aboriginal-focused communications strategy and review select information products to improve CMHC's communications with Aboriginal target audiences and ensure that CMHC information materials are distributed as widely and effectively as possible.

The final report includes a comprehensive listing of Aboriginal communities and organizations; identification of the targeted audience's various preferred means of receiving information; a communication plan and product distribution strategy; evaluation of relevant publications; and recommendations on how to broaden the existing CMHC web site to meet the needs of Aboriginal users.

Prepared by Chignecto Consulting Group Inc. CMHC Project Officer: Marcelle Gareau. Ottawa: Canada Mortgage and Housing Corporation, 2003. ca. 347 pages

STATUS : New Completed Report

AVAILABILITY : Available on a loan basis only from the Canadian Housing Information Centre

INVESTIGATING AND DOCUMENTING FIRST NATION TECH SERVICES INSTITUTES

The objective of this project is to undertake the profiling of two provincial First Nation technical services organizations for the purpose of documenting organizational success factors in a user-friendly framework.

CMHC Project Officer : *Alain F Croteau*

Division : Assisted Housing Division

AVAILABILITY : Product is not yet available

CIDN : 24751500

STATUS : Ongoing

ON-RESERVE HOUSING PROJECTS IN DIFFICULTY - CAUSES AND SOLUTIONS

The purpose of this project is to conduct extensive research into all facets of the difficulties experienced by CMHC On-Reserve housing projects through reviews of information available from CMHC, DIAND and non-governmental organizations with an interest or involvement in Aboriginal housing.

CMHC Project Officer : William E Lortie
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available
CIDN : 24841500
STATUS : Ongoing

PATTERNS AND TRENDS OF URBAN ABORIGINAL RESIDENTIAL SETTLEMENT

This project will generate new geographical aggregations for demographic and socioeconomic analysis of census data. The basis for determining the new boundaries will be relative density of the urban Aboriginal population. The regions of interest are Prairie centres over 40,000 population (approximately 10). The geographies will be developed by aggregating from the smallest geographical unit available from Statistics Canada and the 2001 Census. This will probably be dissemination area data, but block-face data may also be available for straight population counts.

CMHC Project Officer : *Phil Deacon*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25570200
STATUS : Ongoing

RESPONSIVE RESEARCH INTO ABORIGINAL HOUSING ISSUES: A PILOT PROJECT

This project is a partnership of CMHC, Indian and Northern Affairs Canada, Aboriginal Healing Foundation and the Policy Research Initiative. The project will fund four research grants to university scholars for studies that combine an Aboriginal perspective, a housing & community focus and strong mentoring of new researchers. Also included is an evaluation of the grant process. One research study has started which looks at housing issues for Aboriginal post-secondary students.

CMHC Project Officer : *Phil Deacon*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25320200
STATUS : Ongoing
NEW

TEMPORARY SUPPORTIVE HOUSING FOR ABORIGINAL PEOPLE AND THEIR FAMILIES

First Nation members in many communities in northern Ontario must travel to regional centres to access community services, such as medical, health, educational and employment services. In most cases, they must also find temporary accommodation while accessing the services. The objective of this research is to examine the temporary housing situation of these First Nation members. The research will examine needs, preferences and issues while identifying solutions. The research will provide a general overview of the current situation concerning temporary accommodation in Sioux Lookout, Fort Francis, Kenora and Thunder Bay. This will include identifying the types of accommodation that are available, the reasons for which these accommodations are being used, and the costs that are associated with them.

CMHC Project Officer : *Marcelle M Gareau*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 26740200
STATUS : Ongoing

ABORIGINAL HOUSING

URBAN ABORIGINAL PERCEPTIONS OF ACCESS TO HOUSING

The objectives of this project are: 1) to obtain baseline data on the nature and extent of discrimination in housing that Aboriginal people experience - case studies focus on Winnipeg and Thompson, Manitoba; 2) to quantitatively and qualitatively examine the key variables associated with housing discrimination for Aboriginal people, including such factors as residential migration/mobility and social cohesion; and 3) to explore the effect that discrimination in housing for Aboriginal people has with regard to other victimization.

CMHC Project Officer : *Phil Deacon*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 19900200
STATUS : Ongoing

CHILDREN·S ENVIRONMENTS

HOUSING FORM AND QUALITY IN RELATION TO CHILDREN'S MENTAL HEALTH

This External Research Project (ERP) examined whether housing form and quality are related to the socio-emotional health of children. It used standardized measures of housing quality and mental health, two major housing forms (single family and low-rise cluster), and considered the role of various potentially moderating influences, including socioeconomic status and indoor population density to answer the basic question: "How, if at all, does housing form and quality affect the socio-emotional health of urban Canadian children." The findings of the study assert the presence of a link between housing quality and children's socio-emotional health. Child behavior problems, as assessed by parents, occurred when the physical condition of the residence's interior and exterior, and the neighborhood, as assessed by both teachers and parents, was worse. These relations remained after controlling for household income, parent's education, parent's mental health status, child's gender, and time lived in the residence, and the relations were not significantly moderated by any of these factors.

CMHC Project Officer : Fanis Grammenos
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 24370200
STATUS : Ongoing

CITY PLANNING AND HUMAN SETTLEMENTS

QUALITÉ D'UN LIEU ET QUALITÉ DE VIE : UNE ANALYSE DES QUARTIERS CENTRAUX DE MONTRÉAL

This research project deals with quality of life and quality of location in the central districts of Montréal. This study is based on the concept of quality of location and also on the concepts of sustainability, well-being and quality of life.

The first part of the report presents a principal component analysis of the quality of a location, using the census data by census sector for the overall new city of Montréal. This data includes socio-demographic variables, socio-economic variables, labour market variables, variables related to the means of transportation to the workplace, linguistic variables, a migration variable, and different housing descriptors concerning the age, maintenance, type, value and cost of dwellings, as well as household size. There were three principal component analyses: the first was done using the population data, the second was focused on the housing data, and the third combined both the population and housing variables. The principal component analysis combining both the population and housing data revealed the main dimensions according to which the residential space is organized in Montréal.

The second part deals with the analysis of the survey data on quality of life and quality of location perceived by the residents of three Montréal districts. The selected sampling territories were the following three boroughs:

- The first was the Plateau Mont-Royal borough, which is almost entirely dominated by the family status composed mainly of single people living alone and by travel on foot or bicycle.
- Then, there was the Côte-des-Neiges borough, which stands out on account of the ethnicity factor.
- Lastly, the third sampling territory was the Hochelaga-Maisonneuve borough, which constitutes a homogeneous space compared to the first two boroughs.

An analysis of the survey data revealed some interesting results depending on the districts, on the one hand, and with regard to subjective quality of life, on the other.

Prepared by André Langlois and Claude Marois. Ottawa: Canada Mortgage and Housing Corporation, 2003. (External Research Program Research Report) 153 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION AND EASING MEASURES

The objectives of this study are, first, to analyze the current regulatory frameworks that could support proposals for the requalification of Quebec suburbs and, second, to propose measures that could be introduced to make it easier for these districts to adapt to the social and physical changes that they are undergoing.

CMHC Project Officer : *Philippe LeGoff*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 24370208
STATUS : Ongoing

SOCIO-ECONOMIC BASELINE BETWEEN CITIES AND RESERVES

The objectives of this study are to use model estimations and a scan of relevant literature to: (i) develop an understanding of the similarities and differences between the economies of urban non-reserve and reserve communities; and, (ii) to develop an understanding of how the relative development of a community, reserve or non-reserve, impacts the overall economics of the community.

CMHC Project Officer : *Tan M Crombie*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 28670200
STATUS : Ongoing
NEW

CONSUMER PROTECTION

RE-SALE OF LEAKY CONDOS: DID THE BUYER KNOW?

This study investigates the transparency of transactions of re-sale condos in the coastal climate area of BC. The motivation for the study was concern that the impact of BC's leaky condo phenomenon is exacerbated by the sale of affected units to subsequent buyers without full disclosure. There are standard clauses which are recommended for use in real estate contracts that mandate the use of investigative tools that are designed to reveal the true nature of the property being purchased. Despite the existence of these tools, there are many cases where the process failed. It is not known if the investigative tools are adequate to discover problems that may exist in the re-sale condo, if real estate agents are consistently employing recommended clauses in the Contract that would require the investigations to be employed, or if the buyer understands the information they receive.

The premise of this study was that by examining cases where the process failed, it may be possible to understand how it happens. Forty cases in the coastal climate area were reviewed.

The results of the study showed that during the time period of the cases studied (1996-2002), use of the recommended clauses had increased over time. Contracts of Purchase and Sale for transactions that occurred since 1999 more consistently used the investigative tools. However, there continues to be ambivalence – from buyers and their buyer agent - to the value of professional property inspections. Since 1999, a professional property inspection was only employed in 50% of the transactions studied.

The conclusion is that the investigative tools are flawed in various ways, the Contract of Purchase and Sale may still fail to request all the documentation and there is little assistance for the buyer in understanding and analyzing the information they receive.

Prepared by Nancy Bain. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2003. (CMHC External Research Program Report) 58 pages

Note: No. 03-108 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

COOPERATIVE AND NON-PROFIT HOUSING

CAPITAL REPLACEMENT PLANNING MANUAL FOR CO-OPERATIVE AND NON-PROFIT HOUSING PROVIDERS = MANUEL DE PLANIFICATION DU REMPLACEMENT D'IMMOBILISATIONS : ÉDITION À L'INTENTION DES ORGANISMES DE LOGEMENTS COOPÉRATIFS ET SANS BUT LUCRATIF

Co-operative and non-profit housing providers need capital reserve funds to be ready to pay for major replacements and repairs as their buildings age. This manual shows you how to develop a step-by-step capital replacement plan (CRP). It will help you to budget and pay for major replacements without large rent increases or emergency funding. You can use a spreadsheet program to produce your CRP, or obtain our free companion software, Capital Replacement Planning Software. Written for non-technical or non-financial housing corporation administrators, the manual also includes very detailed life expectancy guidelines for all housing components.

Produced by the Canadian Housing and Renewal Association in collaboration with the Co-operative Housing Federation of Canada and the Ontario Non-Profit Housing Association. Ottawa: Canada Mortgage and Housing Corporation, 2003. 132 pages Bilingual

STATUS : New Completed Report *Order number 63171*

AVAILABILITY : Available in full text on CMHC web site + from CMHC Information Products

CAPITAL REPLACEMENT PLANNING SOFTWARE - WINDOWS 95/98 = APPLICATION DE PLANIFICATION DU REMPLACEMENT D'IMMOBILISATIONS - WINDOWS 95/98

The interactive Capital Replacement Planning Software (CRPS) makes it easy for you to develop your CRP. You can enter and edit data, calculate annual reserve requirements, run "what-if" scenarios, and print professional quality reports for Board approval. This CD is the companion to the Capital Replacement Planning Manual (Windows 95/98 version).

Ottawa: Canada Mortgage and Housing Corporation, 2003. CD-ROM

Order number: 63202 Bilingual

STATUS : New Completed CD-ROM
AVAILABILITY : CMHC Information Products

CAPITAL REPLACEMENT PLANNING SOFTWARE - XP VERSION = APPLICATION DU PLANIFICATION DU REMPLACEMENT D'IMMOBILISATIONS - - XP VERSION

The interactive Capital Replacement Planning Software (CRPS) makes it easy for you to develop your CRP. You can enter and edit data, calculate annual reserve requirements, run "what-if" scenarios, and print professional quality reports for Board approval. This CD is the companion to the Capital Replacement Planning Manual (Windows XP version).

Ottawa: Canada Mortgage and Housing Corporation, 2003. 1 CD-ROM

Order number: 63203 Bilingual

STATUS : New Completed CD-ROM
AVAILABILITY : CMHC Information Products

CONVERTING ALEXANDRA PARK INTO THE ATKINSON CO-OPERATIVE: AN EVALUATION OF THE PROCESS

In 1990 residents of Alexandra Park, a public housing development located in downtown Toronto, began to explore tenant self-management. By 1993, with assistance from representatives from the co-op sector, and later more formally, the Co-operative Housing Federation of Toronto (CHFT) in 1995, residents started to take steps towards converting to a self-managing non-profit residential co-operative. More than 10 years later, in 2002, residents are much closer to their goal of becoming a co-operative. Agreements are still being negotiated between the Atkinson Co-operative (the new co-operative established to manage Alexandra Park) and the Toronto Community Housing Corporation that now controls the public housing development.

This study documents and evaluates the conversion process at Alexandra Park and identifies lessons that can be learned from this experience. The study used a variety of research methods including participant observation, a literature review, a review of all relevant documentation pertaining to the conversion, key informant interviews and focus groups with residents.

Prepared by Linda Lapointe, Lapointe Consulting Inc. in association with Jorge Sousa. CMHC Project Officer: Vern Barkwell. Ottawa: Canada Mortgage and Housing Corporation, 2002 (CMHC External Research Program Report) 116 pages

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

COOPERATIVE HOUSING PROJECTS IN DIFFICULTY

The purpose of this project is to analyze the causes of cooperative housing projects being in difficulty.

CMHC Project Officer : *Graham Murray* **CIDN** : 24850500
Division : Audit and Program Evaluation Services **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF COOPERATIVE HOUSING

The objective of this project is to conduct surveys for an evaluation of cooperative housing. Original data will be gathered from surveys of occupants of cooperative housing projects (and of occupants of other housing types for comparative purposes), from members of boards of directors and managers of housing projects, and from portfolio managers. In addition, an inspection of housing conditions will be completed by professional building inspectors.

CMHC Project Officer : *Graham Murray* **CIDN** : 24850500
Division : Audit and Program Evaluation Services **STATUS** : Completed
AVAILABILITY : Product is available

ONLINE GUIDE TO CO-OPERATIVE HOUSING IN CANADA

This research will result in online information for co-operative housing agencies and members in each province and territory on their rights and responsibilities in regard to: admitting new members, obligations to the co-operative of members, obligations of the co-operative to members, eviction or expulsion of members, and collection of money owed.

CMHC Project Officer : *Ian Melzer* **CIDN** : N/A
Division : External Research Program **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

RISK MANAGEMENT FOR FEDERAL CO-OPERATIVE HOUSING PROGRAMS: A MODEL FOR THE ADMINISTERING AGENCY: FINAL REPORT

This study was prepared by the Co-operative Housing Federation of Canada for CMHC in connection with the cooperative housing sector's proposal for the creation of a new agency to administer cooperative housing. It identifies the risks associated with the cooperative housing portfolio and the relative importance of these risks. It also outlines absolute and relative performance indicators to assess and identify risks and outlines a monitoring model based on these indicators. Finally, the study outlines a strategy for intervention by the prospective agency to address the identified risks.

Ottawa: Co-operative Housing Federation of Canada, 2002. 44 pages plus appendices

STATUS : Completed Report
AVAILABILITY : Available on loan from: Canadian Housing Information Centre

ASSESSMENT OF THE OUTCOMES FOR HABITAT FOR HUMANITY HOME BUYERS

Habitat for Humanity Canada (HFHC) was founded in 1985 and its affiliates have built more than 600 homes across Canada since then. While there is substantial anecdotal evidence that homeowners' lives are improved by their move to stable homeownership, there has not been a careful survey done to document what positive results families experience after moving into their homes. The intent of this study is to gather information and to ascertain any problems existing HFHC homeowners are having. The project will specifically

- examine how access to a stable home ownership environment has changed outcomes for families who have been participants in HFHC's program in Canada;
- assess and suggest improvements to the partnership aspects of the HFHC program; and finally
- assess how the financial well being of Habitat households changes over time after they occupy their home.

The results of the research should be available at the end of the year.

CMHC Project Officer : *Bruno Duhamel* — ***CIDN*** : 26470212

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

ENHANCING THE APPLICABILITY AND USEFULNESS OF CMHC'S HOMEOWNER'S MANUAL FOR NEW HOMES

This project's objective is to expand the current content of the Homeowner's Manual to reflect a wider range of current and past house construction systems and components and to enhance the Manual with additional features in order to increase its usefulness to home purchasers and its appeal to builders, realtors and home inspectors.

CMHC Project Officer : *Fanis Grammenos* — ***CIDN*** : 24930200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

ESTIMATING PRIVATE AND SOCIETAL HOMEOWNERSHIP COSTS AND BENEFITS IN CANADA

Support for homeownership is a public policy goal, but there are both private and societal costs and benefits associated with it. Private costs, in the absence of government intervention, are those accrued directly to the individual families, not society (e.g. payment of interest on mortgage). Societal costs, on the other hand, are those, in absence of government intervention, accrued to the individual families and society on an undivided basis (negative externality). Private benefits, in the absence of government intervention, are those accrued to individual families, not society (e.g. capital gain). Those accrued to the individual families and society on an undivided basis (positive externality) without government intervention are termed societal benefits. Since the distribution of homeownership costs and benefits varies by region, income and other socio-economic characteristics, the project estimates its private and societal impacts in selected Canadian cities including Vancouver, Calgary, Winnipeg, Toronto, Montreal and Halifax.

CMHC Project Officer : *Jessica Yen* — ***CIDN*** : 26590200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

IMPACT OF THE HOME BUYERS' PLAN ON HOUSING DEMAND

The Home Buyers' Plan (HBP) was introduced in February 1992. The HBP is aimed at facilitating access to homeownership by allowing households to withdraw up to $20,000 tax free from their Registered Retirement Saving Plans (RRSPs) to cover the down payment for the home. Such withdrawals must be repaid through a series of annual payments equal to 1/15 of the amount withdrawn over a maximum period of 15 years. Should households fail to make the required repayment, they must add the amount in default to their taxable income.

This tax measure is very popular. Between its introduction and 1998, the HBP has enabled over 777,000 individuals to withdraw close to $7.5 billion from their RRSPs to finance the purchase of their first home and, in 1998, just over 111,000 households withdrew an average amount of $9,400. However, no one has yet developed a stringent analysis or an adequate modelling of the advantages and drawbacks of the HBP. This issue is all the more important in that the behaviour of the participants in the plan is quite varied. In fact, despite the growing popularity of the HBP, it can be seen that a significant proportion of participants do not make the full repayment required into their RRSPs according to the terms of the HBP. The purpose of this study is to analyze the impact of the HBP.

First, the study explains the popularity of this program, showing the potential financial gain. This analysis identifies those households who gain the most from this program. Then, the research studies how saving and consumption decisions are modified by the HBP. The analysis is theoretical and makes use of a housing demand model based on a continuous-time life-cycle analysis. This model was initially applied to housing demand by Artle and Varaiya (1978) and subsequently used by Wheaton (1985) in the United States and Fortin (1988) in Canada, among others.

Prepared by Fréderic Chartrand and Mario Fortin, Economics Department, Université de Sherbrooke. CMHC Project Officer: Ian Melzer. Ottawa: Canada Mortgage and Housing Corporation, 2003. (External Research Program Research Report) 37 pages

Note 1: Aussi disponible en français sous le titre : L'impact sur régime d'accession à la propriété sur la demande de logement

Note 2: No. 03-009 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

HOMELESSNESS

APPLICABILITY OF A CONTINUUM OF CARE MODEL TO ADDRESS HOMELESSNESS: FINAL REPORT

This report presents the results of a study that examined the Continuum of Care (CoC) model of addressing homelessness in the United States (US). The model requires communities to develop coordinated action plans in order to receive funding by the US Department of Housing and Urban Development (HUD) for local homelessness initiatives. Four sites were studied to explore the model's benefits, limitations, similarities and differences. The selected sites for the case studies were:

1. Broward County, Florida
2. King County, Seattle, Washington
3. City of Memphis, Tennessee
4. Philadelphia, Pennsylvania

The case studies were conducted using secondary data collection methods including interviews, document reviews and self-administered questionnaires. The final phase of the research involved a survey of Canadian stakeholders to examine the applicability of the CoC homelessness model for

Canada based on the findings of the case studies and their knowledge of the Canadian environment.

Prepared by: Social Data Research Ltd. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2002. ca. 68 pages

Note: No. 03-115 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

DEVELOPING AND TESTING OF A METHODOLOGY FOR MAINTAINING CONTACT WITH HOMELESS PERSONS IN A LONGITUDINAL STUDY

The objective of this research is to use the ongoing panel study located in Ottawa, Pathways Into and Out of Homelessness, to develop and empirically validate a methodology for longitudinal studies of highly mobile populations, specifically the methodology for locating (maintaining in the sample) homeless participants over time.

CMHC Project Officer : *Anna Lenk*	**CIDN** : N/A
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

FAMILY HOMELESSNESS: CAUSES AND SOLUTIONS: FINAL REPORT

This report describes recent trends in family homelessness, causes and conditions that contribute to family homelessness, the impact of homelessness on children, and ways and means of addressing family homelessness.

Information for this report was obtained from three different sources: a literature review, structured telephone interviews with 74 key informants who were involved in providing services to families who are homeless or at risk of homelessness, and face-to-face qualitative interviews with 59 families who were homeless or formerly homeless. These families were referred or recruited by several different agencies in the cities included in the study.

Interviews with both agencies and families were conducted in Victoria, Vancouver, Calgary, Winnipeg, Peel Region, Toronto, Montreal, Quebec, Saint John, and Halifax.

When considering the information obtained from all the sources used in this study, including the literature review, interviews with agency key informants, and interviews with families, the high degree of consistency in much of the data provides clear direction on many of the factors contributing to family homelessness and ways to address this problem.

Prepared by Social Planning and Research Council of BC, Deborah Kraus, Paul Dowling. CMHC Project Officer: Jim Zamprelli. Ottawa: Canada Mortgage and Housing Corporation, 2003. ca. 208 pages

Note: No. 03-006 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

GOVERNANCE IN ORGANIZATIONS ADDRESSING HOMELESSNESS

Across the country, the homeless situation is becoming more severe as the number of homeless persons steadily increases in most major Canadian cities. In order to address the needs of a more diverse and growing number of homeless people, organizations and agencies have had to adjust their methods of program delivery and management. Effective governance has become a critical aspect of meeting the needs of the homeless population.

Although there is a considerable body of literature and research on the homeless population there is less information available on the governance characteristics of agencies that are attempting to address the needs of the homeless. This report attempts to address this deficiency by examining governance characteristics of a number of agencies working with homeless people. A series of case studies identify the partnerships, board structures and strategies these agencies are using in their work with the homeless population.

The report begins with a brief examination of the changing characteristics of the homeless population, noting the trends exhibited in large Canadian cities. This is followed by an overview of the current program and funding framework within which agencies working to address the needs of the homeless operate. Then there is a review of the applicable literature on governance. This initial material sets the context for a detailed discussion on aspects of governance within organizations dealing with the homeless, focusing specifically on their ability to govern their affairs and the development and use of partnerships in the delivery of services in an ever changing and complex environment. This is accomplished through detailed case studies of agencies distributed across the nation and chosen to reflect a range of different organizational characteristics. A synthesis of the case study material is provided in the main body of the report and the detailed case studies themselves are contained in the Appendices. The report concludes with a summary of best practice applications and lessons learned.

Prepared by Institute of Urban Studies & Urban Aspects Consulting Group Ltd. with assistance from Sylvia Novac, Centre for Urban and Community Studies, Luba Serge, Research Associate, Janet McClain, Research Associate. Submitted to Canada Mortgage and Housing Corporation and National Secretariat on Homelessness. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2003. 274 pages

Note: No. 03-114 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

HOUSING OPTIONS FOR ELDERLY OR CHRONICALLY ILL SHELTER USERS

This national study for Canada Mortgage and Housing Corporation is an exploration of problems and solutions related to elderly and chronically ill shelter users. The central research questions to guide the study were:

- Why are elderly people and chronically ill persons living in shelters for homeless people?
- What are their residential long-term care needs?
- What are the barriers to their accessing long-term care, and how can these barriers be reduced or removed?
- What strategies have been developed in Canada to address the needs of this population?

The study was undertaken in three phases. First, an international literature review and an exploratory survey of professional networks were conducted to identify fundamental issues. Second, key informant interviews were carried out with long-term care providers, placement co-ordination service providers, emergency shelter providers, and long-term care providers within the emergency shelter system. Third, 13 case studies that respond to the needs of elderly and chronically ill shelter users were completed.

The findings of this exploratory study echo much of what is found in literature on homelessness from other countries: there is a paucity of studies on elderly homelessness; elderly homeless persons are quite vulnerable, especially from younger homeless persons; while many elderly homeless persons are homeless only once and for a short duration, others are chronically homeless and maintaining permanent housing may be of considerable difficulty for this group. The literature on health care and homelessness underlines the difficulty in providing adequate and constant care as well as the consequences of this problem: premature ageing among homeless persons and a greater likelihood of dying from preventable causes.

Interviews with key informants from the long-term care and homelessness sectors reveal that they experience similar challenges: the supply does not meet the need – whether it is the need for shelters, transitional housing or residential long-term care. The interviews also made it clear that information on elderly, homeless women in particular is scarce or undocumented. Furthermore, while many shelters are barrier-free, some remain inaccessible to persons with mobility problems and, if personal care is required, most shelters cannot accommodate the need. Finally, it is clear that lack of co-ordination and integration of health services and shelters is an issue of considerable concern, especially discharge planning for homeless patients leaving hospitals: such integration is still in its infancy in many cities.

Findings from the 13 case studies confirm what was learned from key informant interviews. For example, the integration of health and shelter services is nascent in Canada. As well, few examples of an integrated approach between shelters and mainstream long-term care facilities were found. Most residential projects documented in this study were developed by shelter providers. This approach raises a number of questions including how to protect the more vulnerable elderly homeless persons from younger, possibly predatory shelter users and what the ideal settings for residential projects for elderly homeless persons should be: the city core with its close proximity to services or outlying areas, away from dangerous situations.

Despite the development and delivery of the solutions reported in this document, the needs of elderly and chronically ill homeless people in Canada are still largely unmet. Most of the facilities documented in this study have waiting lists. Service providers stated that even if the number of places they can offer were doubled or tripled, the need would still be unmet.

Prepared by Luba Serge and Nancy Gnaedinger. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2003. 109 pages

Note: No. 03-119 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

HOUSING, LONG TERM CARE FACILITIES AND SERVICES FOR HOMELESS AND LOW-INCOME URBAN ABORIGINAL PEOPLES LIVING WITH HIV/AIDS: ISSUES IDENTIFICATION PAPER

The objectives of this research study of limited scope were: a) to examine housing issues and residential facilities and services available to homeless and low-income Aboriginal people with HIV/AIDS in urban centres, and gaps in services; b) to identify appropriate services for homeless and low-income urban Aboriginal people with HIV/AIDS.

This research report is a synthesis of secondary research; a review of the existing literature, and primary research conducted utilizing survey questionnaires with 29 respondents that included a range of Aboriginal and non-Aboriginal service providers as well as Aboriginal people living with HIV/AIDS in Vancouver, Edmonton, Regina, Winnipeg, Toronto, Ottawa, Montreal and Halifax. Two of these respondents spoke to the specific issues affecting Aboriginal people with HIV/AIDS in the Far North (Inuit) and Labrador. In addition, three (3) Native American HIV/AIDS organizations in New York, in Minneapolis-St. Paul and in Oakland were contacted for relevant information.

regarding housing options and culturally appropriate models of long-term care for Native Americans living with HIV/AIDS.

The profile of Aboriginal people with HIV/AIDS in urban centres that emerged from this limited research study indicates they are a heterogeneous low-income population whose housing and care needs may differ. At the same time, a majority of this population is living on the "hem of life" in unstable housing conditions and in destabilizing lifestyles. Additional supports, services and transitional housing are required to meet their housing and care needs which differ from those of Aboriginal people with HIV/AIDS in a stable lifestyle. There is also a need to ensure that the specific housing and care needs of Aboriginal families living with HIV/AIDS, particularly those of single-parent, female-headed families, are met.

Service providers and Aboriginal people with HIV/AIDS (PHAs) identified a number of important gaps in housing, long-term residential care facilities and services for homeless and low-income Aboriginal people living with HIV/AIDS in urban centres.

Prepared by Susan Judith Ship and Laura Norton for Sweetgrass Consulting. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2003. 62 pages.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

STABLE HOUSING FOR SUBSTANCE USERS (DRUG AND ALCOHOL): LESSONS FOR HOUSING PROVIDERS

This project is intended to be an investigation of innovative or alternative residential or housing programs for persons who are homeless or at risk and are substance users. The research will include case studies of programs and service providers who consider their housing or residential facility as one which makes use of the harm reduction philosophy or approach or are contemplating a modification of existing conventional approaches or creating new programs in this regard. The research should answer the question as to which housing interventions and which factors most effectively help homeless persons with addictions to access and, more importantly, maintain stable housing.

CMHC Project Officer : *Jim Zamprelli*

CIDN : 26770200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

NEW

TRANSITIONAL HOUSING: OBJECTIVES, INDICATORS OF SUCCESS, OUTCOMES

Transitional housing is a combination of housing and services intended to facilitate self-reliance and self-sufficiency. In some cases, it is difficult to distinguish transitional housing from supportive housing except for the time limit, which varies depending on the program and the provider. This study will focus on the time-limited aspects of transitional housing which distinguish it from permanent supportive housing. The project will include a literature review and case studies (outcome evaluation is beyond the scope of this project).

CMHC Project Officer : *Anna Lenk*

CIDN : 26750200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

HOMELESSNESS

WHERE DO THEY COME FROM? WHY DO THEY LEAVE? WHERE DO THEY GO? A STUDY OF TENANT EXITS FROM HOUSING FOR HOMELESS PEOPLE

Using a multi-method research approach that included in-depth interviews, focus groups and a cross-sectional survey, this study focused on the housing stability of formerly homeless persons who live in two alternative housing programs for the "hard-to-house" in Toronto. A central theme from the in-depth interviews was the challenges that participants experienced in the shared housing model. Multivariate logistic regression analysis of data from the cross-sectional survey identified that social support and quality of life (satisfaction with living situation) were significant predictors of housing stability.

Prepared by Uzo Anucha with the assistance of J. David Hulchanski. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2003. (CMHC External Research Program Report) 131 pages.

NOTE: No. 03-005 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

HOUSE CONSTRUCTION INDUSTRY

ANALYSIS OF RESIDENTIAL LABOUR MARKET

Research is needed to compare skill requirements in the residential and commercial real estate industries by trades. Research is also needed at national and local levels in order to assess the extent of labour shortage in the construction sector. The latter information should be by trade, CMA based when possible and grouped by market type, i.e. overheating, stable and cold markets. In the comparative phase the objective is to have a timely, current and accurate descriptive analysis of the construction industry.

CMHC Project Officer : *Eric Tsang*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 27610200

STATUS : Ongoing

NEW

HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21ST CENTURY

This study examines the evolution of the new house building and renovation construction industry in Canada during the 1990s, the industry's current and future challenges in the period to 2010 and the opportunities for the industry to respond to those challenges. Within this context it looks at the industry and the influences of a variety of external factors.

The focus is the private sector. Public sector activity, namely federal, provincial/territorial and municipal government involvement in social housing construction and delivery, is not covered in the paper.

Topics discussed include:

- the structure of the industry: understanding how the industry is organized and how it functions is a major element in comprehending how external factors affect the industry and how the industry will meet future challenges; and

- external factors that have both short- and long-term effects on the industry: identifying the major trends in areas such as demographics, the economy, regulation, technology; these are important when considering what the future may be like for the industry.

The final section of the paper assesses the challenges and opportunities the industry will face over the next decade.

The study's methodology included a literature review, data gathering and analysis, and a consultation process involving housing industry stakeholders. The report's findings on existing and emerging trends include such aspects as: economic factors, regulatory factors, mortgage financing, trade and labour mobility, development cost charges, taxes, fees and construction costs and technology.

Prepared by Urban Aspects Consulting Group Ltd. & Langlais et associés. CMHC Project Officer: Ian Melzer. Ottawa: Canada Mortgage and Housing Corporation, 2002. 124 pages

Note: No. 03-004 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

HUMAN RESOURCE DEVELOPMENT IN THE HOUSING SECTOR

CMHC has agreed to provide funding to the Canadian Home Builders' Association (CHBA) for developing a work plan by the end of 2003 against specific short-term, medium-term and long-term objectives, an organization to implement the work plan, and a budget to implement the work plan (the role of governments in skills training and immigration will be discussed in the work plan). The work will take into account: (i) the distinct attributes of the home-building and renovation sectors; (ii) provincially-mandated education and training and other jurisdictional issues; and (iii) regional differences.

CMHC Project Officer : *Eric Tsang*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28690200
STATUS : Ongoing
NEW

INDUSTRY PROFILE OF CANADIAN LIGHT STEEL BUILDING

This research will provide an overview of the current Canadian lightweight steel framing industry.

CMHC Project Officer : *Jessica Li*
Division : Canadian Housing Export Centre
AVAILABILITY : Product is not yet available

CIDN : 24310900
STATUS : Ongoing

POTENTIAL ELEMENTS OF A HUMAN RESOURCES DEVELOPMENT STRATEGY FOR THE RESIDENTIAL CONSTRUCTION INDUSTRY

This project's objective is to briefly discuss the unique challenges confronting the housing sector in terms of labour supply and to outline the main components of a human resources development strategy for the residential construction industry. The paper is intended to form the basis of discussion at an upcoming facilitated workshop wherein the potential elements of a human resources development strategy for residential construction will be further refined and developed.

CMHC Project Officer : *David D'Amour*
Division : Strategic Planning
AVAILABILITY : Product is not yet available

CIDN : 25000100
STATUS : Ongoing

HOUSE CONSTRUCTION INDUSTRY

RISK AND LIABILITY IN RESIDENTIAL CONSTRUCTION

The objectives of this project on risk and liability in residential construction are to: (i) develop a better understanding of the issues surrounding builders' risk insurance through some background research to assess the nature and magnitude of the risks, the market for builders' risk insurance, and related issues including supply and costs; and (ii) develop a better understanding of the issues surrounding post-construction liability, including an assessment of the nature and magnitude of the risk, health-related risks and liability, the market for post-construction liability insurance, time limits, insurance costs, and links with the residual liability of home warranty programs. A draft report is being reviewed.

CMHC Project Officer : *Eric Tsang* ***CIDN*** : 03MYR9114

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available ***NEW***

HOUSING

CANADIAN HOUSING OBSERVER

Illustrated with extensive, colourful charts, the *Canadian Housing Observer*, offers readers a comprehensive review of housing in Canada, identifying and commenting on the most important trends and issues. It brings together national coverage with details on provinces and major metropolitan areas.

As a stand-alone print publication, the *Observer* is a concise, valuable resource. The chapter headings reveal the scope of the publication:

1. Introduction: Why Housing Matters
2. The State of Canada's Housing: An Overview
3. A Portrait of Canada's Housing
4. Demographic and Socio-economic Influences on Housing Demand
5. Current Housing Market Developments
6. Trends in Housing Finance
7. Housing Affordability

The web version of the *Observer* -- available at www.cmhc.gc.ca -- provides links to more detailed housing data relating to the trends reviewed in the print publication, covering all major housing markets across Canada, including provinces and metropolitan areas. The *Observer* data tables will be refined and expanded over time, as additional information becomes available.

Ottawa: Canada Mortgage and Housing Corporation, 2003. 148 pages

NOTE: Bilingual

STATUS : Completed Report *Order number: 63125*

AVAILABILITY : On the CMHC web site and from CMHC Information Products

ENVIRONMENTAL SCAN ON THE USE AND EFFECTIVENESS OF GEOGRAPHIC INFORMATION IN THE HOUSING SECTOR IN CANADA: FINAL REPORT

Hickling Arthurs Low (HAL) Corporation was engaged by CMHC to investigate the use and effectiveness of geographic information (GI) in Canada's housing sector, and to undertake comparisons of this use with that in Australia, Germany, and the United States. This study went beyond a narrow consideration of geographical information systems (GIS) to include all GI and tools, including such disciplines as cartography, photogrammetry, surveying, remote sensing, etc.

Information was collected through a literature and web review, interviews, an electronic survey and a workshop. The study team conducted over 70 in-depth confidential interviews, 40 in Canada, 32 in Australia, Germany, and the USA. An electronic survey was conducted of housing sector stakeholders across Canada. A workshop was held to consider further uses of GI for the real estate segment of the housing sector.

The organizations consulted fell into two broad categories: those which had a primary interest in geographic information and secondary interests in thematic data, of which one application involved housing; and those which had a primary interest in the housing sector and peripheral interests in GI as a component of their total information needs. The results of the consultations revealed that there are very few personnel with a primary interest in both areas, reflecting the minor role GI and geospatial tools play in the housing sector.

This study reviewed the use of GI in a number of housing sub-sectors, both in Canada and abroad. Consideration of the status of GI use in each housing sub-sector, and the potential for benefits, led to recommendations of where effort should be focused in promoting GI use in the future. These recommendations balance considerations of which sub-sectors already have made significant progress in GI use (and thus require less assistance) and which sub-sectors have little potential to benefit from GI (and, thus, there is little to gain from assistance).

Most housing sub-sectors have achieved a reasonable balance between current GI use and potential benefits. However, there are three housing sub-sectors where GI promotions and efforts could provide increased benefits. These are, in order of priority, real estate, appraisal and assessment, and safety and security.

Prepared by Hickling Arthurs Low. CMHC Project Officer: Pierre Lanciault. Ottawa: Canada Mortgage and Housing Corporation, 2003. 157 pages

Note : Aussi disponible en français sous le titre : Analyse de l'environnement : utilisation et efficacité de l'information géographique dans le secteur de l'habitation canadien

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

HOUSING NEEDS OF LOW-INCOME PEOPLE LIVING IN RURAL AREAS

This research report summarizes the housing situations of low income persons living in rural areas of Canada. It also identifies the barriers to addressing their housing needs, and the opportunities that exist in rural communities and small towns to address these situations.

Three approaches were employed to develop an understanding of the housing needs of low income people living in rural areas. A literature review and a statistical review were conducted concurrently. This was followed by 12 case studies conducted in 12 diverse rural communities and small towns across Canada. This included key informant interviews and a review of relevant local documents. The case study sites were:

Brooks, Alberta	Preeceville, Saskatchewan	Coral Harbour, Nunavut
Russell, Manitoba	Kingston-Greenwood, N.S.	Saint-Fabien-de-Panet, Québec
Maniwaki, Québec	St. Stephen, N.B.	Marystown, Newfoundland and Labrador
Wawa, Ontario	Mississippi Mills, Ontario	Port Elgin, Ontario

Statistical Review prepared by Paddy Fuller with David Bruce, Tom Carter, and Ed Starr. Literature Review prepared by David Bruce with Tom Carter and Glenda Quinn. Case Study Report prepared by David Bruce with contributions from Tom Carter, Ed Starr, Jino Distasio, Ausra Burns. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2002. 3 volumes (Distinct Housing Needs Series)

Note 1: Aussi disponible en français sous le titre : Les besoins en matière de logement des personnes à faible revenu habitant en milieu rural

Note 2: No. 116 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

PARTICIPATION DES RÉSIDENTS ET STRATÉGIES DE RESPONSABILISATION DES COLLECTIVITÉS

This study deals with the viability of housing-related enablement strategies in a multiethnic context. It attempts to evaluate if cultural diversity can hinder collective action and identifies possible solutions promoting involvement and enablement initiatives in an ethnic context like that of Parc Extension in Montréal (targeted neighbourhood). The quantitative section of the study includes a survey among the residents of the neighbourhood, aimed at studying the relation between certain key factors, such as cultural diversity, the feeling of belonging, the property management approach and social behaviour and the willingness to get involved in the typical enablement project. Through statistical tests and a series of logistic regressions, certain conclusions were reached, including: that the factors that generally favour involvement are operational, even in a multiethnic context like that of Parc Extension; that the application of enablement approaches poses some particular obstacles, related especially to language barriers; that housing has a role to play, more specifically the property management approach; and that the residents seem ready to take up the challenge of involvement but not necessarily that of leadership.

Prepared by Marguerite Montfort with the assistance of Renée Lachapelle. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) ca. 152 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

SPECIAL STUDIES ON 1996 CENSUS DATA

This project develops a series of concise studies that explore the housing conditions reported in the 1996 Census of Canada to inform and assist decision-making planning and policy formulation by industry, all levels of government and non-profit organizations. Twelve studies are currently completed and available on the CMHC Web site:

- Research Highlights Issue 55-1: Canadian Housing Conditions uses data primarily at the national level, explains commonly used terminology, and examines the largest groupings of households.
- Research Highlights Issue 55-2: Housing Conditions in Metropolitan Areas examines Canada's 25 Census Metropolitan Areas.
- Research Highlights Issue 55-3: Housing Conditions of Immigrants discusses the housing conditions of households whose primary maintainer is an immigrant to Canada.
- Research Highlights Issue 55-4: Housing Canada's Children examines the housing environment of Canada's children.
- Research Highlights Issue 55-5: Changes in Canadian Housing Conditions, 1991-96 examines changes in the housing conditions of non-farm, non-Native households between the two Censuses.
- Research Highlights Issue 55-6: Housing Conditions of Native Households examines the housing conditions of households defined as Native using the self-identification definition available in the Census for the first time in 1996.
- Research Highlights Issue 55-7: Canadian Households in Core Housing Need and Spending at Least Half Their Income on shelter, profiles the characteristics of these Canadian households which in 1996 constituted under 7% of the 9.8 million households studied, or about 38% of the 1.7 million households in core housing need.
- Research Highlights Issue 55-8: Seniors' Housing Conditions examines the housing conditions of households led by persons 65 years of age or older.
- Research Highlights Issue 55-9: Housing Conditions of Women and Girls, and Female-led households examines the housing conditions of women and girls, and of households with a female primary maintainer.
- Research Highlights Issue 55-10: Housing Conditions of North American Indians, Métis and Inuit Households in Canada examines the housing conditions of the three main Aboriginal identity groups and of Aboriginals in urban areas, rural areas and on reserves.
- Research Highlights Issue 55-11: Housing Conditions of Rural Households examines the housing conditions of households defined as rural by CMHC.
- Research Highlights Issue 55-12: Housing Conditions of Immigrants in the Toronto CMA examines immigrants households in the Toronto CMA, comparing conditions across different Census Subdivisions (York, Etobicoke, Mississauga, etc).

CMHC Project Officer : *Lance Jakubec*

CIDN : 19880200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Research highlights are available

ADDRESSING HOUSING NEED THROUGH ACQUISITION OF EXISTING DWELLINGS: SECHELT, BC = RÉPONDRE AUX BESOINS DE LOGEMENT PAR L'ACQUISITION D'UNITÉS D'HABITATION EXISTANTES : SECHELT (C.-B.)

This project aimed to acquire and operate 15 existing units as affordable housing, primarily for low-income single women (with or without dependents) in the Town of Gibsons, BC.

The primary purposes were to improve access to affordable housing for the target group and to demonstrate the feasibility of using existing housing stock, selected from a market that is either depressed or conventionally low in cost, to acquire a scattered portfolio of dwellings in order to meet social housing needs.

The initiative failed to achieve its objectives for a number of reasons, but inability to secure funding support from BC Housing Management Commission was the main difficulty.

When the original project objective was foreclosed due to absence of provincial funding, volunteers fashioned an idea of a housing registry, generated at community workshops, into a workable and affordable alternative for improving access to affordable market housing.

The final report was produced by the Coast Housing Society to document this initiative in order to share information with those wanting to address the need for affordable housing in their community.

Final report submitted to Homegrown Solutions by Coast Housing Society. Ottawa: Canada Mortgage and Housing Corporation, 2002. 42 pages

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

AFFORDABLE HOUSING COMPONENT OF CMHC'S WEB SITE

This work identified several recent affordable housing projects worth portraying as examples of innovative affordable housing solutions on the CMHC web site. Innovative ideas included financial, planning, management and design solutions. The research was followed by writing descriptions of these projects to highlight the innovative mechanisms used by the project's sponsors. Descriptions of projects will be posted on the web site in sequence under the banner "project of the month". The work also identified additional Canadian web sites which contain information and resource material related to affordable housing, and prepared brief descriptions of the content of the new and existing web sites. These sites are to be incorporated as links within the affordable housing component of CMHC's web site.

CMHC Project Officer : *Fanis Grammenos*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 2430 0200002
STATUS : Ongoing

AFFORDABLE HOUSING IN CANADA'S URBAN COMMUNITIES: A LITERATURE REVIEW

The Privy Council Office created an internal task force on urban communities in 2002 to compile and present a strategically useful profile of federal programs and services in Canada's urban communities, to develop a targeted research agenda for assessing the impact of federal policies and programs on urban communities and to guide the development of a strategy in support of the government's agenda. Affordable housing is an identified priority issue in the context of targeted research on social cohesion, inclusion and diversity, and sustainable environment and urban infrastructure. This literature review is intended to identify issues with respect to urban affordable housing and will complement research into other topic areas and facilitate discussion on linkages between housing and other social, economic and environmental issues of concern to Canada's urban centres. This review is the first phase of a broader planned study on affordable housing. The goals of the overall study are to: identify and analyze current key issues and challenges facing Canadian urban communities in the field of affordable housing; provide an overview of the Government of Canada's current and historic role in the affordable housing sector; and identify best practices and successful models of affordable housing policy and provision in Canada's urban communities.

Prepared by Sharon Chisholm. CMHC Project Officer: Brian Davidson. Ottawa: Canada Mortgage and Housing Corporation, 2003. 60 pages.

Note : Aussi disponible en français sous le titre : Le logement abordable dans les collectivités urbaines du Canada : étude documentaire

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

ASSESSMENT OF THE DIRECT AND INDIRECT IMPACTS OF THE ACT PROGRAM

The purpose of this project was to assess the impact of the ACT Program both directly from ACT-funded projects and indirectly through initiatives that have replicated ACT solutions without funding from the program.

Interviews were conducted with up to 2 project leaders and partners for 26 ACT funded projects, to assess direct impacts. Interviews were conducted with 43 municipal officials (drawn from the ACT mailing list, the ACT Forum participant list and from referrals from direct interviewees) to determine if their municipality had replicated or used ACT ideas or solutions to implement regulatory reforms to address housing affordability and choice issues, without ACT funding.

Prepared by David Bruce, Rural and Small Town Programme, Mount Allison University. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 2003. 88 pages

STATUS : New Completed Report

AVAILABILITY : Available on a loan basis only from the Canadian Housing Information Centre

CROSS-SECTIONAL ECONOMETRIC ANALYSIS OF HOUSEHOLD HOUSING AFFORDABILITY AND NEED

The project is an econometric study of the statistical correlation between the socioeconomic factors associated with housing and core housing need. In general terms, the study would calculate the statistical correlation of housing affordability and core need to such factors as (but not limited to): 1) household income, size, composition, and type (family versus non-family); 2) age, sex and marital status of primary maintainer; 3) living arrangements (living alone versus with others).

CMHC Project Officer : *Lance Jakubec* ***CIDN*** : 27460200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FINAL REPORT ON THE TERRASSE GREENFIELD PROJECT "FROM TENANCY TO COMMUNITY OWNERSHIP = RAPPORT FINAL SUR LE PROJET DES TERRASSES GREENFIELD "DE LA LOCATION À LA COPROPIÉTÉ"

Services d'Animation Teninform Inc. sought to facilitate a process of tenant acquisition in order to rehabilitate and to preserve ongoing affordability of a large 200-unit private rental project on the South Shore of Montreal, originally developed as a limited dividend project. The attempt to organize residents, and to undertake a feasibility assessment was funded in part by Homegrown solutions and by the pro-bono contribution of coordination and legal services of Services d'Animation Teninform Inc.

The initiative has not been successful due to a number of factors:

- A very litigious environment in which the existing owner is engaged in legal action against individual tenants, the residents association and the municipality;
- Reluctance on the part of the Municipality or tenants' association to approve conversion of the property to facilitate sale of individual units;
- Very limited interest on the part of existing residents in participating in a tenant-led acquisition -- underpinned by fears that rents will increase, even though this would likely be combined with extensive physical repairs;
- Inability to retain a well qualified consultant to animate and coordinate the process;
- Lack of local funding to facilitate the acquisition and rehabilitation process; and
- A large scale metropolitan amalgamation process that has preoccupied the energy of municipal officials.

Although very little progress has been made to date, the proponents believe that there may be an opportunity in the future due to the more extensive resources of the amalgamated municipality as well as the possibility of additional funding under the new federal-provincial affordable rental program.

Prepared by Arnold Bennett, President, Services d'Animation Teninform Inc. Submitted to Homegrown Solutions. Ottawa: Canada Mortgage and Housing Corporation, 2002. 33 pages

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

IDEAS THAT WORK: BEST PRACTICES IN AFFORDABLE HOUSING MANAGEMENT

The Canadian Housing and Renewal Association (CHRA) has documented this sample of best management practices in Canadian social housing to help providers address their pressures and promote improvement across the sector.

This manual contains six best practice case studies, a synopsis of 27 good management practices across Canada, a section on future trends -- creative new initiatives that have not yet been fully implemented or had time for a thorough evaluation -- and an overview of two best practice initiatives currently underway in B.C. and Ontario. Best and good practices in affordable housing management were selected in six key areas for this manual: financial management; maintenance; governance and accountability; housing management; development planning; and human resources management. In addition, the "Resources" section identifies other information sources for achieving best practices.

Non-profit societies and housing cooperatives can adopt or adapt the examples in this manual to streamline administrative processes, use resources more efficiently and effectively, improve fiscal accountability, accountably, enhance self-sufficiency and encourage innovation

The research work and development of the manual was undertaken by a research team led by Jim Woodward of Jim Woodward & Associates Inc. CMHC Project Officer: Bill Lortie. Produced with the assistance of Canada Mortgage and Housing Corporation and Peel Non-Profit Housing Corporation. Ottawa: Canadian Housing and Renewal Association, 2002. 48 pages

Note : Aussi disponible en français sous le titre : Des idées qui fonctionnent : pratiques exemplaires en gestion de logements à prix abordable

STATUS : Completed Report
AVAILABILITY : Canadian Housing and Renewal Association

IMPACT OF ZONING ON HOUSING AFFORDABLITY

The purpose of this project is to undertake a critical analysis of the Glaeser and Gyourko paper "The Impact of Zoning on Housing Affordability". This analysis is composed of three components:

- Understand the place of the paper in the literature on land use regulation and determine the extent of the general usefulness of the theoretical model to understanding the relationship between all facets of affordability and government regulations on new housing construction;
- Address questions on the extent to which the results of the paper are a unique artefact of the authors' data, including replication of the author's work with alternative measures of construction costs and land use regulation; and
- Define and address the policy questions in Canada using existing sources of data on housing and government regulation.

Through these components, the Contractor will assess the extent to which differences in house prices and housing affordability across Canada can be explained by land use regulations.

CMHC Project Officer : *Rachid Aqdim*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28460200
STATUS : Ongoing
NEW

REFINING OF CMHC HOUSING AFFORDABILITY INDICATORS

The purpose of this project is to undertake a study to refine CMHC housing affordability indicators.

CMHC Project Officer : *Louis Trottier*   ***CIDN*** : 23201000
Division : Market Analysis Centre   ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RELATIONSHIP BETWEEN HOUSING CONDITIONS AND WEALTH

The objective of this research is to analyze data from Statistics Canada's 1999 Survey of Financial Security to explore the relationship between housing conditions and wealth with a view to examining the net worth, including assets and debts, of households above and below the housing affordability standard.

CMHC Project Officer : *Roger D Lewis*   ***CIDN*** : 28250200
Division : Policy and Research Division   ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SCIP WEB SITE FOR PUBLIC RELEASE

The purpose of this research is to revise the content of the prototype dynamic SCIP web site and complete preparation of the content uploading to a static reference Sustainable Communities Indicator Program (SCIP) site housed on Environment Canada's web site to assist municipalities establishing, developing and monitoring their own sustainable communities indicators programs. The updated SCIP site is now accessible through the Environment Canada web site.

CMHC Project Officer : *John E Engeland*   ***CIDN*** : 24270200
Division : Policy and Research Division   ***STATUS*** : Ongoing
AVAILABILITY : Product is available on the web

ST. CLARE'S MULTIFAITH HOUSING SOCIETY: 25 LEONARD AFFORDABLE HOUSING PROJECT = ST. CLARE'S MULTIFAITH HOUSING SOCIETY : ENSEMBLE DOMICILIAIRE ABORDABLE, 25, AVENUE LEONARD

This report documents the construction of 50 units of affordable apartments targeted to low income singles exiting the shelter system. It is the culmination of 5 years of effort by an advocacy organization - Toronto Action for Social Change (TASC) - combining advocacy with a pragmatic "just do it" approach.

TASC became involved with a group of street youth that had been arrested for squatting in the square fronting Toronto City Hall after they were evicted from a squat. After helping the youth secure bail and dealing with the justice system, a partnership emerged with a focus on finding a way to build affordable housing where youth like these could live. In the absence of ongoing social housing programs, the task was to find a way to secure a property, funding and financing.

TASC incorporated a legal entity so that the group would be eligible for charitable status and could make offers on property. The group focused its efforts on trying to acquire existing properties suitable for conversion to apartments. After making offers on various properties, an agreement for purchase was successfully negotiated on a former medical office building at 25 Leonard, in downtown Toronto. The property was converted to create 50 small one-bedroom units.

HOUSING AFFORDABILITY

25 Leonard is one of the first projects to be built in Ontario outside of a formal program, and based on bundling together various sources of funding and using a creative financing approach - including the line of credit approach as a way to secure property. This final report was produced by the St. Clare's Multifaith Housing Society to document this initiative in order to share with those wanting to address the need for affordable housing in their community.

Prepared by St. Clare's Multifaith Housing Society. Final report to Homegrown Solutions. Ottawa: Canada Mortgage and Housing Corporation, 2002, 47 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

THINK BIG: ACT SMALL: AN OVERVIEW OF THE PETERBOROUGH COMMUNITY HOUSING DEVELOPMENT CORPORATION

Peterborough Community Housing Development Corporation (PCHDC) was created in 1998 to address the void in meeting the need for affordable housing. Established with a broad base of support from the community, business and political sectors, this corporation has quickly evolved as a leading example of innovation and resourcefulness. Initially funded by Homegrown Solutions to develop a community land trust as a vehicle to hold acquired properties, work on the community land trust is still ongoing. The PCHDC relieves a serious affordable housing shortage in Peterborough by rescuing old homes (some slated for demolition), renovating them, and renting them to low-income families. In order to operate effectively, the PCHDC forms partnerships with other agencies and community organizations in the public, private and non-profit sectors. The PCHDC acts as a developer, builder, landlord, and property manager.

This final report provides an overview of the PCHDC experience in Peterborough and provides insights into methods of community organizing, broadening community support, cost effective ways to acquire and develop housing, effective fund raising techniques and creativity in leveraging new assets.

Prepared by the Peterborough Community Housing Development Corporation. Final report to Homegrown Solutions. Ottawa: Canada Mortgage and Housing Corporation, December 2002, 20 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

HOUSING AND IMMIGRATION

INSERTION RÉSIDENTIELLE DES JEUNES ISSUS DE L'IMMIGRATION À MONTRÉAL : RAPPORT FINAL, VERSION DÉFINITIVE

This research is the result of cooperation between CMHC and the Immigration et métropoles interuniversity research centre as part of the Metropolis Project with which CMHC is associated as a federal partner.

Back in 1996 in the Montreal metropolitan area, more than one resident in six (17.8 %) was born outside Canada. The immigrant population is growing in both absolute and relative terms. Since 1986, the household formation rate is higher among immigrants than among non-immigrants. There is thus reason to believe that young immigrants are accounting for an ever-increasing share of the residential market in the Montreal area.

The objective of this study is to paint a descriptive picture of the residential situation of young persons who are the products of immigration in Montreal in 1996 between 15 and 29. The research is based on a special compilation of census data from 1996 for the Metropolitan Montreal area (according to a 28-zone division) obtained from Statistics Canada. In this report, the authors deal with the following dimensions:

- the type of occupation (owner or tenant);
- the type of housing lived in;
- its location within the metropolitan area; and
- the affordability ration (i.e. the percentage of income earmarked to housing expenses).

The report also contains financial status indicators of the households concerned -- median income and the frequency with which income is less than $20,000.

Prepared by Anne-Marie Séguin, Damaris Rose, Jaël Mongeau, INRS-Urbanisation, Culture et Société. CMHC project officer: Kim Anh-Lâm. Report produced as part of the Metropolis Project and submitted to Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2003. 96 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

METROPOLIS - CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues through a network of research centres in Canadian universities (Centres of Excellence). The results of the research will be used for the assessment of and development of policies and programs affecting immigrants and new Canadians. As an example, CMHC should benefit from research to be undertaken by the Centres in such areas as:

1. the effect of immigration on housing markets, demand and supply;
2. the effect of immigration on urban development, including issues of renewal of the urban core;
3. the impact of immigration on housing need, affordability, homelessness and the demand for social housing;
4. the social and spatial mobility of immigrants as compared with the profiles of the Canadian-born;
5. the relationship between immigration and the formation of ethnic, cultural or religious enclaves; the dynamics of enclaves - their role in integration (bridging or isolating), their economic role, their effect on city life, on urban renewal, on public safety, and so forth;
6. the relationship between metropolitan infrastructure (the quantity, quality and distribution of housing and public space) and immigrant integration.

Information on Metropolis and on close to 200 funded research projects can be found at canada.metropolis.net

CMHC Project Officer : *Jim Zamprelli*

CIDN : 25640200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is available on the web

HOUSING AND TAXATION

ASSESSMENT OF A LOW INCOME HOUSING TAX CREDIT PROGRAM FOR CANADA

The first objective of this study is to develop alternative design options for the Low Income Housing Tax Credit Program (LIHTC) in Canada. These include the US LIHTC as the base option. Canadians have the immense advantage of being able to learn from the US experience and to make changes to the LIHTC, in light of US evidence. More important, changes to the design of the US LIHTC would be needed to adapt it to the Canadian context, for the income tax treatment of rental real estate, the social housing environment and the structure of the real estate development industry. The second objective is to assess from a qualitative perspective, and when possible from an empirical perspective, the impacts and ultimate viability of each design and its implications, especially for government costs. This project report should be available in early 2005.

CMHC Project Officer : *Bruno Duhamel* ***CIDN*** : 26470206
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

HOUSING EXPORT OPPORTUNITIES

CANADIAN INDUSTRY IN THE AREA OF SENIORS HOUSING IN TOKAI REGION, JAPAN

This project's purpose is to conduct research/analysis on export opportunities for Canadian industry in the area of seniors housing in Tokai region, Japan.

CMHC Project Officer : *Laura Diakiw* ***CIDN*** : 27350900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CASE STUDIES ON WOOD-FRAME CONSTRUCTION IN RUSSIA

This project's objective is to carry out case studies on existing Canadian wood frame houses in the cities of Omsk, Sakhalin, Rostov and Moscow in Russia to identify possible performance problems in their design and/or construction. The study will evaluate Russia's recently adopted Building Code for Single Family Houses and identify differences between this code and Part 9 of the Canadian code. In addition, the project will assess the extent to which the new Russian Building Code and regulations are available, understood, and enforced.

CMHC Project Officer : *Anand Mishra* ***CIDN*** : 30990900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CERTIFICATION - CHINA ROADMAP

This study will initiate a "roadmap" for Canadian manufacturers on product approvals in China. This initial study will provide a general overview of the certification process for foreign products, plus specific information on a couple of product categories.

CMHC Project Officer : *Murray Rasmusson* ***CIDN*** : 27270900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

EXPORTING TO MEXICO: LESSONS LEARNED FROM THE CANADIAN HOUSING INDUSTRY

This report includes a presentation of the Mexican housing situation, an analysis of Canadian company experience in Mexico, and, an analysis of CMHC's role vis-à-vis the Mexican market.

Prepared by Mercadex International Inc. CMHC Project Officer: Tulio Conejeros. Ottawa: CMHC International, Canada Mortgage and Housing Corporation, 2003. 89 pages.

Note : Aussi disponible en français sous le titre : Exporter au Mexique : Leçons tirées de l'industrie canadienne de l'habitation

STATUS : New Completed Report

AVAILABILITY : Available on the CMHC web site and from CMHC International

EXPORTING TO RUSSIA: LESSONS LEARNED FROM THE CANADIAN HOUSING INDUSTRY PROJECT

The objectives of this project are:
-- to identify needs, challenges, and opportunities in the Russian housing market.;
-- to investigate the operational experience of Canadian housing exporters in Russia;
-- to identify export barriers, business opportunities and the challenges facing Canadian housing exporters in Russia;
-- to identify key success factors employed by Canadian housing exporters in Russia;
-- to assess the comparability between the requirements of the Russian housing market and the capabilities of the Canadian housing industry; and
-- to assess CMHC's past role in assisting the Canadian housing export industry to market effectively in Russia.

CMHC Project Officer : *Mietka Zieba*
CIDN : 28030900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

GERMAN HOLIDAY FUND SCHEME

Are you planning to export or provide Canadian labour services in Germany? The unique German holiday fund scheme may impact your company. This document reflects on the function of the German "Holiday Fund Scheme". It analyzes particularly the possibilities for Canadian producers of prefabricated houses and log homes to be exempted from the compulsory membership in the fund.

Prepared by Andreas Saggau. Ottawa: CMHC International, Canada Mortgage and Housing Corporation, 2003. 32 pages

Note : Aussi disponible en français sous le titre : La Caisse de vacances allemande

STATUS : New Completed Report

AVAILABILITY : Available on the CMHC web site and from CMHC International

GETTING STARTED! GUIDE TO BUILDING REGULATIONS IN THE UNITED KINGDOM

This guide will help Canadian exporters of housing systems and components, to better understand the UK regulatory framework, to obtain the necessary approvals and to identify potential trade obstacles as well as regulatory issues.

It focuses on the market that will be of most interest to Canadian exporters: new-build, low-rise residential buildings up to three storeys above ground; principally detached, semi-detached and row (terraced) housing. This guide covers wood-frame house construction known as timber frame housing in the UK. It also considers all the related components such as finishes (linings), claddings, insulation, vapour control layers and joinery.

"Getting Started" is organized into a number of sections:

- Section 1 describes The Building Regulations 2000 for England and Wales that apply to housing up to three storeys. This section describes the Canadian export potential.
- Section 2 gives some essential information which needs to be considered even before an exporter can begin getting started.
- Section 3 describes the way that UK timber frame houses are built to meet these standards, gives an overview of the similarities and differences of Canadian housing design and where necessary, identifies additional measures needed to meet the requirements
- Section 4 provides guidance on the UK procedures for approvals and certification for housing products and systems.
- Section 5 gives an overview of the UK housing warranty schemes.
- Section 6 provides references and information sources for exporters.

Appendices provide additional information including: the Housing Corporation "Scheme Development Standards" for social housing; an overview of building regulations for Scotland and Northern Ireland, and a glossary of building and construction terms.

Prepared by Geoffrey C. Pitts in association with Jeff Armstrong, Bill Boles, Bruce Gough, Julie Levi and Simon Palmer. CMHC Project Officer: Terry Robinson. Ottawa: CMHC International, Canada Mortgage and Housing Corporation, 2003.

Note : Aussi disponible en français sous le titre : Pour commencer! Guide aux réglementations du bâtiment au Royaume-Uni

STATUS : Completed Report

AVAILABILITY : Available: CMHC International and on the CMHC web site: http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=57582

GUIDE FOR CANADIAN EXPORTERS TO U.S. BUILDING CODES AND STANDARDS

The purpose of this project is to research and identify key regulatory differences across the U.S. which have a significant impact on Canadian housing exports, and to prepare an industry-friendly guide for Canadian exporters which will help them adapt their products and systems to meet U.S. regulatory requirements and to target regional markets more successfully.

CMHC Project Officer : *Marie-Hélène Pastor*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 25370900
STATUS : Ongoing

HOUSING CONSTRUCTION COST COMPARISON IN EXPORT MARKETS

To undertake research and report on the comparative cost of housing construction in export markets. Cost estimates were obtained for construction of a "typical" Canadian wood-frame house and the local traditional housing unit in twelve countries including Canada. The data enables cost comparisons at the whole house, building component and elemental levels. The data collection has been completed, results have been verified and final revisions are now being completed to the report and costing database.

CMHC Project Officer : *Terry Robinson* ***CIDN*** : 19590200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

KEY U.S. HOUSING MARKETS: OPPORTUNITIES AND CONTACTS

Key U.S. Housing Markets: Opportunities and Contacts are guides for the Boston, Chicago, Dallas and Seattle housing markets in the United States.

The market guides are designed to help Canadian producers of residential building products and services understand and penetrate the local market. Each guide is a reference tool that includes economic, demographic and housing overviews, as well as trends and detailed information on housing projects, renovation activity and demand for five building products which are: cabinetry, doors and windows, flooring, siding (roofing in the case of Seattle) and pre-engineered or panelized building systems. The guides provide local contact information, key trade regulations and processes, and identify associations and government agencies that may provide further information.

The guides were prepared by The Starr Group Inc. and F.W. Dodge Canada and commissioned by CMHC in partnership with Department of Foreign Affairs and International Trade. Ottawa: Canada Mortgage and Housing Corporation, 2002. 1 CD-ROM

Note : Aussi disponible en français sous le titre : Les principaux marchés de l'habitation aux États-Unis : Occasions et contacts

STATUS : Completed CD-ROM
AVAILABILITY : CD-ROM is available and product is available on the CMHC web site at: http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/repu/repu_016.cfm

MARKET POTENTIAL FOR CANADIAN LIGHT STEEL BUILDING IN CHINA

This research will provide an overview of the light steel housing market in China.

CMHC Project Officer : *Jessica Li* ***CIDN*** : 24310900
Division : Canadian Housing Export Centre ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HOUSING EXPORT OPPORTUNITIES

PRELIMINARY ASSESSMENT OF JAPANESE HOMEBUYER SEGMENTS SURVEY

This study identifies market segments among Japanese residential homebuyers, according to their preferences for different performance characteristics of a house. It also reviews major forces shaping the Japanese residential housing market.

Prepared by David H. Cohen, Natalia Vidal, Wellington Spetic, Rafael Ide, and Robert A. Kozak. Ottawa: CMHC International, Canada Mortgage and Housing Corporation, c2003. 45 pages

Note: Aussi disponible en français sous le titre : Évaluation préliminaire de l'enquête visant les segments d'acheteurs de maison japonais

STATUS : New Completed Report
AVAILABILITY : Available on the CMHC web site and from CMHC International

PRODUCT CERTIFICATION ROADMAP

A product certification roadmap will be developed which will provide key Chinese approval agency contacts and procedures for selected product categories. Practical advice for product certification will be included.

CMHC Project Officer : *Terry Robinson*
Division : CMHC International
AVAILABILITY : Product is not yet available
CIDN : N/A
STATUS : Ongoing

RESEARCH ON THE HOUSING MARKET IN THE UNITED KINGDOM

This project's objective is to provide an update on the United Kingdom housing market which will highlight the scope of the market and its opportunities for the Canadian housing industry.

CMHC Project Officer : *Roger Leger*
Division : CMHC International
AVAILABILITY : Product is not yet available
CIDN : 27340900
STATUS : Ongoing

HOUSING FORECASTING AND DEMAND

COHORT ANALYSIS OF CANADIAN HOUSING TRENDS

This External Research Project will use cohort data to explore the housing careers of Canadians living in all regions of the country and born between 1905 and 1974. The objectives of the work are to examine how the housing careers of birth cohorts differ from that which might be deduced from cross-sectional data, to identify differences among cohorts, and to relate the housing careers of cohorts to the socio-economic conditions they have experienced. The analysis should provide insights into the viability of forecasting future behaviour of households using different types of data; for example, it could be that cohort data will suggest different implications for housing choices in the future than cross-sectional data.

CMHC Project Officer : *Roger D Lewis*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : N/A
STATUS : Ongoing

HOUSING FORECASTING AND DEMAND

ESTIMATION OF CORE HOUSING NEED USING THE 1999 SURVEY OF HOUSEHOLD SPENDING MICRO DATA FILE

The objective of the project was to test the feasibility of implementing the core housing need methodology on the 1999 Survey of Household Spending (SHS) micro data file. The Household Facilities and Equipment micro data file that CMHC had used in the past for developing inter-censal estimates of core housing need was no longer available and CMHC wanted to explore other sources of inter-censal information on housing need. The Survey of Household Spending contains much of the same data content as HIFE as well as the expenditure items that had been previously collected by the Family Expenditure Survey. However, the SHS sample is considerably smaller than HIFE. This limited both the ability to develop norm rent incomes for sub-provincial areas and to produce detailed cross-tabulations of core housing need by socio-economic characteristics at lower levels of geography. The project used two versions of the file – the publicly released version and a non-released working version held within Statistics Canada. As a result of this project, the publicly released version will in future contain a revised size of area of residence breakdown that distinguishes metropolitan areas and makes the file more suitable for housing need analysis. While SHS contains the necessary content for the application of the core housing need methodology, the sample size constrains the use of the file in both deriving norm rents and detailed analysis of households in core housing need. It does contain detailed expenditures and income for the same time period, which makes is a good platform for expenditure analysis.

Prepared by Paddy Fuller, Fuller Information. CMHC Project Officer: John Engeland. Ottawa: Canada Mortgage and Housing Corporation, 2003. (CMHC External Research Program Report) 53 pages

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

HOUSING MARKET

ETHNIC CHANGES AND THE HOUSING MARKET IN RIVIÈRE-DES-PRAIRIES, MONTRÉAL

This project's objective is to provide an understanding of the residential building depreciation mechanism in order to find out the share of the effects of ethnicity in relation to the general economic conditions prevailing on the market in Rivière-des-Prairies, Montreal.

CMHC Project Officer : *Philippe LeGoff*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 24370204
STATUS : Ongoing

EXPLAINING HOUSE PRICE VARIATIONS IN CANADA

The aim of the study is to explain changes in new and existing housing prices at the city level from 1972 to 2002, using both supply-side and demand-side factors. The project will also investigate the extent to which stock-market wealth is a determinant of the demand for housing as well as the extent to which housing prices are a determinant of consumer spending and investment in non-housing assets (through refinancing).

CMHC Project Officer : *Rachid Aqdim*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 31310200
STATUS : Ongoing
NEW

IMPACT OF CONVERSIONS OF RENTAL TO OWNERSHIP UNITS ON HOUSING MARKETS IN ONTARIO

This study seeks to generate a framework for addressing the changes in the availability of affordable housing stock in large Ontario cities through conversions of rental units and, by extension to understand the impact of these conversions on other components of the housing market, in particular the new homes market.

CMHC Project Officer : *Alain Miguelez*
Division : Market Analysis Centre
AVAILABILITY : Product is not yet available

CIDN : 22261000
STATUS : Ongoing

IMPACT OF INVESTORS ON THE MARKET FOR APARTMENT CONDOMINIUMS IN SELECTED MARKETS IN THE VANCOUVER CMA

Canada Mortgage and Housing Corporation is interested in the role that apartment condominiums play in the supply of rental housing in the Vancouver CMA, specifically in a study area consisting of the cities of Vancouver (Downtown, Westside and Eastside), Burnaby and Richmond. Anecdotal information suggests that investors have purchased a significant share of the many new apartment condominiums developed in the study area since 1990, and then leased them as rental apartments. However, information about these rental condominiums, including the number of them, is sketchy due partially to the difficulty of distinguishing between owner-occupied and rental condominiums. In contrast, developers have built very few new purpose-built rental-only apartment buildings since then.

CMHC retained PricewaterhouseCoopers LLP ("PwC") to investigate the rental market for apartment condominiums in the study area over the 1990 to 2001 period. PwC obtained information for this investigation from various sources including CMHC, the PwC Condominium Database, the British Columbia Assessment Authority (BCAA), published literature, and interviews with condominium developers, property managers and real estate agents familiar with this market.

Prepared by PricewaterhouseCoopers LLP. CMHC Project Officers: Cameron Muir and Charles King. Ottawa: Canada Mortgage and Housing Corporation, 2003.

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

STUDY ON THE RESIDENTIAL PATH OF PEOPLE AGED 45 TO 64 YEARS IN THE MONTREAL AND QUEBEC CENSUS METROPOLITAN AREAS (CMAS)

This project's objective is to provide a study on the residential path of people aged 45 to 64 years in the Montreal and Quebec census metropolitan areas (CMAs).

CMHC Project Officer : *Sandra S Girard*
Division : Market Analysis Centre
AVAILABILITY : Product is not yet available

CIDN : 22931000
STATUS : Ongoing

SURVEY AND LITERATURE REVIEW OF SOCIOECONOMIC TRENDS AFFECTING CONSUMERS AND HOUSING MARKETS

Through the use of a literature review this report evaluated how socioeconomic trends have affected and are anticipated to affect Canadian households and housing markets. Analysis of the impact of key socioeconomic trends and issues on the complex and diverse housing circumstances across the nation was based on a typology of housing submarkets - high growth metropolitan centres, slow growth metro centres, small town Canada, rural communities and the North. Following the identification of trends within twelve theme areas, the submarket typology was used to analyze any differences in these trends in the different submarkets and how they affect different types of communities in different ways. Questions for future research were identified using a number of criteria including: the importance of the issue or trends; the potential of the issue or trend to influence a number of submarkets; the gaps in research that are apparent; and the potential to actually carry out the research (cost, data availability, time requirements, etc.). Eight potential priority questions were identified to help focus future potential research efforts.

Note: No. 03-011 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

CMHC Project Officer : *Ian Melzer*
CIDN : N/A
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Research highlight is available

HOUSING RESEARCH

FEASIBILITY STUDY ON USE OF SOCIAL POLICY SIMULATION DATABASE AND MODEL (SPSD/M)

Statistics Canada's Social Policy Simulation Database and Model (SPSD/M) is a tool designed to analyze the financial interactions of governments and individuals in Canada. It allows estimations of the cost implications or income redistributive effects of changes in personal taxation and cash transfer systems. The purpose of this project is to complete a feasibility study on use of Social Policy Simulation Model (SPSD/M) for housing specific policy and program development and evaluation.

CMHC Project Officer : *Jessica Yen*
CIDN : 27440200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HOME$AVE: BUILDING INVESTMENTS IN HOUSING ASSETS: STUDY OF INDIVIDUAL DEVELOPMENT ACCOUNTS FOR HOUSING - A NATIONAL DEMONSTRATION PROJECT

The research undertakes a national consultation to evaluate Home$ave, an asset-based approach to antipoverty using housing as a catalyst. The main objective of this research is to determine if an asset-based strategy through housing is a viable solution to poverty reduction.

A common assumption is that lower income households cannot save. In 1991, Dr. Michael Sherraden of Washington University in St. Louis illustrated the concept of Individual Development Account (IDA). IDA rewards the monthly savings of lower-income households who are trying to buy their first home, pay for post-secondary education, or start a small business. This reward or incentive is provided through the use of matching funds that typically come from a variety of private and public sources. The hypothesis is that individuals who have an incentive to accumulate assets will do so. Asset accumulation should alter savings behaviours that lead to self-sufficiency, thereby allowing individuals to exit poverty.

This consultation is to validate the assumption that low-income individuals will respond to financial incentives to engage in a range of activities related to housing.

Study prepared for Canada Mortgage and Housing Corporation and the National Secretariat on Homelessness by Social and Enterprise Development Innovations (SEDI). CMHC Project Officer: Eric Tsang. Ottawa: Canada Mortgage and Housing Corporation, 2003. 2 volumes + research highlight
Volume 1 Final Report (59 pages) Volume 2 Background Report (94 pages)

Note 1: No. 03-001 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

Note 2: Aussi disponible en français sous le titre : Mai$on en banque : accumuler des actifs pour mieux se loger : étude sur les comptes individuels de développement axés sur le logement - projet national de démonstration

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

INTERNATIONAL COMPARISON OF HOUSING CONDITIONS INDICATORS

The underlying intent of the work is to describe the housing conditions indicators currently used for planning and policy purposes by the national governments of the United States, England, and Australia, and to compare these with the Canadian core housing need approach. It will focus primarily on the measures and norms used to assess housing conditions, but will also compare the results of applying the indicators for a recent year, and discuss the strengths, weaknesses, and limitations of such a comparison. The result will update and extend the 1992 work "A Comparison of Housing Needs Measures Used in Canada, The United States, and England" (CMHC Socio-Economic Research Highlight Issue 7). The results will be of interest to housing researchers at the federal, provincial, and municipal level, along with academics and any private / non-profit companies involved in measuring housing conditions.

CMHC Project Officer : *Lance Jakubec*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28190200
STATUS : Ongoing
NEW

INFRASTRUCTURE

DEVELOPMENT OF COSTING MECHANISM(S) TO FACILITATE SUSTAINABLE COMMUNITY PLANNING

The purpose of the project is to develop a mechanism(s) that will allow community planners to effectively calculate and convey the full, accurate, long and short term public infrastructure costs of both conventional and more sustainable community planning scenarios. Phase 1 will identify relevant commercially available or partially developed infrastructure costing models and tools and community scenario building tools; identify current relevant sources of financial costing information related to the direct, indirect and external costs affected by development; document current costs for a full range of conventional and alternative infrastructure elements; identify the key costs affected by urban form and the factors that affect them most; apply the key costs to six development scenarios and develop cost/revenue statements for each scenario; construct a methodology to permit planners to effectively calculate and convey reliable net public cost projections for a full range of sustainable community planning scenarios; and if no tool currently exists, develop a framework for a methodology or tool by which the diverse sources and currently unrelated tools used above might be integrated into a single costing/scenario development exercise. Phase 2 of the project will involve the development of a costing scenario tool using the data collected in Phase 1.

CMHC Project Officer : *Cynthia Rattle*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 26950200
STATUS : Ongoing

MORTGAGES AND HOUSING FINANCE

CONSUMER SUPPORT AND PROTECTION IN MORTGAGE AND HOME EQUITY BASED BORROWING: THE U.S. EXPERIENCE AND CANADIAN COMPARISONS: FINAL REPORT

In the U.S. in recent years, there has been a widespread perception that "predatory lending practices" have multiplied dramatically in the residential mortgage market. The report assesses whether the surge in predatory lending practices in the U.S. is an indicator of what is to come in Canada or a uniquely U.S. phenomenon - occurring because of the particular institutional, regulatory social and market framework in the U.S.

First, the U.S. experience was reviewed, including the legislation and political responses. Canadian legislation was then examined and compared with that in the U.S. Differences in the institutional and social framework that might impact the spread of predatory practices in Canada were considered. Options to protect the borrower were then explored.

A background paper drawing together the above elements, and a questionnaire soliciting views on the key issues and options was distributed to selected people in lending, regulation, credit counseling, brokerage and real estate.

Based on the analysis carried out, and drawing from the insights of the respondents, the study concluded that predatory lending is not a serious problem in Canada at the moment, but that certain factors indicate an increased risk of predatory lending in the future. The report suggests initiatives that could be undertaken now to assist borrowers in making choices, and provides a set of recommendations for implementation should future monitoring suggest that predatory lending is becoming a serious problem in Canada.

Prepared by Tony Wellman. CMHC Project Officer: Kamal Gupta. Ottawa: Canada Mortgage and Housing Corporation, 2003. (CMHC External Program Research Report) 97 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

EVOLVING IMPACT OF E-COMMERCE ON CANADIAN HOME OWNERSHIP FINANCE ACCESS AND AFFORDABILITY

The objective of this research was to examine the significant changes arising in the housing finance market place resulting from e-commerce and their impact on housing finance access and housing affordability.

E-commerce describes the process of conducting trade via Internet-enabled technologies. E-commerce makes the computer and the Internet network central to the processes of communication and collaboration between trading parties. In relation to mortgages, e-commerce describes the hardware, software and network applications that allow stakeholders in the mortgage process to share and collaborate electronically to originate, close and service a consumer mortgage online. The focus of this study was to understand how the processes and stakeholders within a mortgage offering may be affected by e-commerce technologies and to examine the impact of these changes on Canadian home ownership finance affordability and accessibility in the period to 2006.

To date, the mortgage industries in Canada and the United States have emphasized e-commerce development differently. Therefore with the intent of understanding broader trends in the Canadian mortgage market, the report compares and contrasts U.S. and Canadian mortgage provision models and stakeholder roles in order to understand the effects of e-commerce technology on the mortgage industry structure and ultimately on the Canadian consumer.

The research project entailed a literature review, Internet searches, interviews and discussions with knowledgeable US and Canadian industry participants, government regulatory agencies, housing sector stakeholders and other key informants.

Prepared by Scott Wilkinson. CMHC Project Officer: Ian Melzer. Ottawa: Canada Mortgage and Housing Corporation, 2002. 173 pages

Note: No. 110 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

HOUSE PRICES, BORROWING AGAINST HOME EQUITY, AND CONSUMER EXPENDITURES

The main objective of this research project is to investigate the different sources of data on refinancing in Canada and examine the effect of changes in house prices on consumer expenditures through borrowing against home equity and in total, through the wealth effect. The study concludes that borrowing against home equity is more common than it used to be, both through refinancing of mortgages with a cash-out and through home equity loans and lines of credit. The paper presents two estimates of borrowing against home equity that have been produced in Canada. However, it found that they do not agree.

The paper highlights the lack of data and inconclusive econometric work to date to measure the size and significance of home equity borrowing in Canada. It considers how home equity withdrawal can be monitored and analyzed and underlines that further analysis of the link between house prices and consumer expenditures through borrowing against home equity is not possible without more information through surveys and enhanced reporting by financial institutions.

CMHC Project Officer : *Rachid Aqdim*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 31320200
STATUS : Ongoing
NEW

IMPACT OF THE 1988 BASEL CAPITAL ACCORD AND PROGNOSIS FOR THE FUTURE

This project is a literature review on the impacts of the 1988 Basel Capital Accord. This literature review will serve to rank impacts by their level of importance, particularly as they are expected to be material to understanding the potential impacts of the new Basel Capital Accord now being finalized. This study will also present which of these impacts are likely to have also occurred in Canada, and recommend, the best possible course of action, including the methodology or methodologies to measure the extent to which these impacts have occurred in Canada.

CMHC Project Officer : *Bruno Duhamel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 27500200
STATUS : Ongoing
NEW

MORTGAGES AND HOUSING FINANCE

UNDERSTANDING RISK-BASED PRICING

This study is to analyze and examine how rating agencies and lending institutions use the risk based pricing approach to price bonds (e.g. sovereign, corporate and municipal), loans (e.g. secured and unsecured) and structured finance products (e.g. asset backed securities, collateral debt obligations and derivatives).

CMHC Project Officer : *Rachid Aqdim*
CIDN : 31390200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

PERSONS WITH DISABILITIES

COST BENEFIT OF RENOVATIONS TO ACCOMMODATE A DISABILITY

This research will investigate the types and costs of renovations that seniors and persons with disabilities have carried out in their home -both single family homes and apartments- to offset the effects of disability. It will also examine the potential impacts of the renovations on: a) occupants, in terms of helping them carry out activities of daily living, enhancing their independence, preventing them from moving out of their homes, etc.; b) home care workers, with respect to helping them do their jobs more efficiently, safer, more effectively, etc.; and c) agencies providing health and home care services, in terms of changes in the frequency or types of services required, ease of providing the services, cost, etc. The study will also examine the potential impact of home renovations, when combined with the necessary social, health and home care services, on the need for institutional care.

CMHC Project Officer : *Ian Melzer*
CIDN : 26800200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DETERMINING THE EFFORT NEEDED BY ADULTS AND SENIORS TO CLIMB RAMPS USING MANUAL WHEELCHAIRS

The objective of this research is to determine the effort needed by adults and seniors to climb ramps using manual wheelchairs.

CMHC Project Officer : *Luis Rodriguez*
CIDN : 23050200
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

ENTRETIEN MAJEUR ET RÉNOVATION RÉSIDENTIELLE, ÉTUDE D'UNE AVENUE POUR AMÉLIORER L'ACCESSIBILITÉ ARCHITECTURALE DES BÂTIMENTS EXISTANTS

This study explores the possibility of improving architectural accessibility performance for existing residential buildings in which major maintenance or renovation work is being done. There is a host of products and materials available on the market which meet universal accessibility criteria and the needs of persons with functional limitations very effectively. These products and materials, which are commonly used, are often attractive and affordable. The authors explored various ways of encouraging public and private homeowners to use products and materials which provide better universal accessibility when they do maintenance or renovate. In 23 instances, products, materials and methods which provide greater accessibility than those generally in use were proposed to three owners/managers of rental housing to find out their reactions and their interest in using them.

The final report includes:

- descriptions of products or materials generally used for maintenance or renovation (including the manufacturers suggested price);
- an evaluation of their performance in terms of universal accessibility;
- a description of replacement products or materials, which perform better (also including the manufacturer's suggested price); and
- arguments and situations put forward by owners to justify their retaining or rejecting the proposed products or materials.

Prepared by Société Logique under the supervision of Sophie Lanctôt. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 92 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

HOUSING STABILITY VALIDITY STUDY

This study will examine the validity of a model of housing stability for people with serious mental illness at risk for homelessness, and a housing stability benchmark evaluation procedure designed for use by housing agencies and their partners. The study will examine the extent to which the concepts and methodologies developed in one local mental health housing system in Canada are applicable to two other jurisdictions: Ottawa and Halifax. The data collected will also allow for a comprehensive benchmark study of housing and support services in these two cities at multiple levels.

CMHC Project Officer : *Anna Lenk*

CIDN : 25250215

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

PROJET P.A.L. : MONOGRAPHIE D'UNE RESSOURCE ALTERNATIVE EN SANTÉ MENTALE

The Projet P.A.L., a non-profit organization, is defined as an alternative mental health resource. Since its founding in 1975 in Verdun, in the underprivileged neighbourhood downtown, P.A.L. has been advocating an overall intervention approach both individually and collectively. P.A.L. has developed services ranging from defending the rights of its members and non-members to psycho-social rehabilitation, while drawing from the potential and capacities of people living with mental illness. As for housing, P.A.L., from the time it began operation, has been concerned with helping people living with mental illness live autonomously in the community. P.A.L. has been offering an accommodation program since 1983, which includes a transition house (6 units) and shared apartments (8 units) over the latter. P.A.L. also established Logi-P.A.L. in 1989, a non-profit organization which offers five social housing units to persons with mental health problems.

The main objective in developing this monograph was to determine the practices and characteristics of P.A.L., one of the first alternative mental health resources to be created in Quebec, and the conditions under which it emerged. A second objective of the research was to specify the intersectorial practices in operation in P.A.L. and in Verdun in the area of housing. The basic instrument used to collect data was the methodological guide developed by Yvan Comeau (2000) and issued by the Centre de recherche sur les innovations sociales (CRISES) to study social economics companies and organizations.

Prepared by Paul Morin under the direction of Yves Vaillancourt, Laboratoire de recherche sur les pratiques et politiques sociales, École de travail social, Université du Québec à Montréal. Ottawa: Canada Mortgage and Housing Corporation, 2003. (CMHC External Research Program Report) 92 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

POPULATION HEALTH

POPULATION HEALTH APPROACH TO HOUSING: A FRAMEWORK FOR RESEARCH

This report presents a framework for analyzing the relationship between housing and health from a population health perspective. The population health perspective is an influential research and policy framework that is motivated by the question "What makes some people healthy and others not?" It suggests that the strongest determinants of health are socio-economic factors in everyday life.

The primary purpose of this report is to propose a conceptual framework intended to guide research on housing and health from a population perspective. The report reviews the primary underpinnings of the population health perspective, emphasizing its importance in the Canadian social policy discourse and the primary evidence base for the population health perspective. A brief overview of previous research on housing and health is presented, the framework for housing and population health is presented and explained, and a number of emergent research questions are identified. Opportunities in children's housing and health research are emphasized and several key issues for housing and health relationships amongst seniors are also identified. The report also identifies some of the unique questions and issues that must be addressed in the study of housing and population health among people from groups that experience marginality and disempowerment: First Nations' Peoples, people with mental illness and addictions, people with disabilities and chronic illnesses, women and visible minorities. The final section of the report emphasizes some of the methodological challenges that must be addressed by researchers studying the socio-economic dimensions of housing.

Prepared for National Housing Research Committee by James R. Dunn. CMHC Project Manager: Phil Deacon. Ottawa: Canada Mortgage and Housing Corporation, Policy and Research Division, 2002. (Distinct Housing Needs Series) 75 pages

Order no. 62980

Note : Aussi disponible en français sous le titre : L'approche de la santé de la population en fonction du logement : cadre de recherche

STATUS : Completed Report
AVAILABILITY : CMHC Information Products

REGULATORY REFORM

INFLUENCE OF AUSTRALIAN REGULATORY REFORMS ON CONSUMERS, HOUSING QUALITY AND AFFORDABLE HOUSING

This joint project with CHBA investigated further the impact of Australian reforms to building regulations, approvals and inspections. There have been two previous projects carried out jointly with CHBA to investigate the ongoing implementation of the regulatory change in Australia. The first, which was preceded by a fact -finding report, focused on the reforms themselves through discussion with government and building industry officials. The second investigated the initial impact on the residential construction sector. The project found that the reforms introduced in Victoria, Australia, had been of benefit to the building industry, however, several lessons have been learned. The reforms are a package and only picking certain elements can undermine the benefits. The reforms require a tight legislative framework, sufficient resources for administration, realistic requirements for building practitioners and warranty insurance providers and flexibility to fine-tune the system following implementation.

CMHC Project Officer : *Mark Holzman*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 2826 0200
STATUS : Ongoing

MODIFYING MUNICIPAL REGULATIONS TO ACCOMMODATE TWO-GENERATIONAL HOUSES IN QUEBEC CITY = MODIFICATION DE LA RÉGLEMENTATION MUNICIPALE PERMETTANT LES RÉSIDENCES DEUX GÉNÉRATIONS À QUÉBEC

In fall 1999, the City of Quebec was awarded an ACT grant to review the current regulatory context and propose changes to municipal regulations in order to encourage the development of two-generational housing in two post-war single-family suburbs in Quebec City.

To this end, the project team carried out the following:

- An inventory of regulatory approaches to secondary suites and two-generational housing in Quebec and elsewhere;
- The identification of incentives and obstacles to these housing types in the pilot neighbourhoods;
- The creation of a regulatory framework for secondary suites;
- The evaluation of the impact of the regulatory changes on the physical, financial and regulatory environments.

The ACT project team drew on the expertise and experience of representatives from the following groups: City of Quebec Planning and Development Assistance Departments; la Société d'habitation du Québec; Laval University School of Architecture; and Germon Construction Inc.

The City made the following key changes to the zoning bylaw in the pilot neighbourhood:

- Permit the conversion of a single-family dwelling into a two-family dwelling by adding a secondary suite;
- Revise site development standards to permit (1) the encroachment into the side setback of a garage transformed into a secondary unit (2) the retention of a parking area in front of a garage which existed before the conversion, and (3) a reduction in the side setback to 1.5 metres on one side, allowing a total of at least 4 metres for both side-yards.

The zoning changes adopted by the City of Quebec provide a regulatory framework for two-generational housing. By rezoning single-family neighbourhoods to permit the addition of secondary suites in conjunction with updating site development standards, municipalities can encourage secondary suite additions while ensuring that their construction complements the lifestyle and architectural character of suburban neighbourhoods. In addition, the public consultation process undertaken for this ACT project has been instrumental in introducing and sensitizing citizens to the concept of two-generational housing. Establishing a regulatory framework for secondary suites helps municipalities ensure an acceptable level of quality for a housing form that is often built illegally.

The case study report discusses the regulatory reform initiative, its goals and the lessons learned.

Case study written by Julie Tasker-Brown, Consultant in Housing Planning. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: CMHC, November 2002. 35 pages (Affordability and Choice Today (ACT) Demonstration Project Case Study)

Order number: 63259
Bilingual

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products

NEW PARKING STANDARDS TO PROMOTE DOWNTOWN DENSIFICATION = NOUVELLES NORMES DE STATIONNEMENT FAVORISANT LA DENSIFICATION DU CENTRE-VILLE

A small city just north of Calgary, Airdrie faced the possibility of simply being a bedroom community for its large urban neighbour. In the late 1990s, the City experienced rapid single family residential growth, but commercial and mixed use developments were not keeping pace. Development of a successful pedestrian-oriented downtown had been identified as a key planning goal. However, Airdrie's existing parking space standards were seen as one of the key obstacles to successful downtown redevelopment and densification.

In 1999, the City of Airdrie decided it needed to :

- survey existing parking supply and future needs in the City's downtown core;
- analyze the need for and impact of current parking requirements in the area;
- look at experience in other jurisdictions;
- develop a long-term densification and parking strategy for the downtown;
- draft and adopt necessary bylaw amendments; and
- promote results to stakeholders.

The City submitted an ACT grant application in October 1999. Airdrie's goal was to make future developments more pedestrian oriented, attracting people likely to walk to stores, services and work. A September 2000 parking study found that peak usage was only 52 per cent for on-street parking and 34 per cent for off-street parking. If the City applied its existing parking requirements to new development in the downtown it would undermine downtown revitalization objectives.

A survey of other municipalities found that Airdrie's requirements were usually towards the more stringent end of the range. By-law amendments were suggested for the downtown area. The new downtown parking bylaw was passed in May 2001. It incorporated new ratios as of right, and allowed for variances based on shared parking, some off-site spaces and cash-in lieu of payments.

The new parking standards represent a substantial reduction in the site area which must be used for stalls -- up to 40 per cent in the case of two bedroom and larger units and 50 per cent for one-bedroom units. This allows for more units per acre, resulting in lower land costs per unit. In some projects, it may allow all at-grade parking, avoiding the much higher costs of garage construction. In Airdrie's competitive housing market, these savings are being passed on to home buyers, allowing more households to quality for the units. By reducing parking requirements for almost all land uses, and allowing shared parking and cash-in lieu, Airdrie's new parking policies for its downtown core encourage mixed use development.

The case study report discusses the regulatory reform initiative, its goals and the lessons learned.

Case study written by Rowena E. Moyes and Carol L. Hancock. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: CMHC, March 2003. 29 pages (Affordability and Choice Today (ACT) Demonstration Project Case Study)

Order number: 63196 Bilingual

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products

CONSULTATION ON HOUSING RENOVATION PROGRAMS: SUMMARY REPORT: CMHC EMPLOYEE CONSULTATION

In the summer of 2002, Canada Mortgage and Housing Corporation, in co-operation with the provinces and territories, undertook a public consultation on the future of the federal government's housing renovation programs. The consultation involved discussions with Canadians on their views on the effectiveness of the renovation programs and their ideas on how the programs could be improved.

CMHC employees were also invited to share their views on the issues raised in the consultation document. This paper provides a summary of the input received from CMHC employees. Separate consultation processes were held in each Region and at National Office. Input was received through individual responses, focus groups and meetings of functional and business teams.

Ottawa: Canada Mortgage and Housing Corporation, December 2002. (Renovation Consultation Report)
35 pages

Note: Aussi disponible en français sous le titre : Consultation sur les programmes de rénovation : rapport sommaire : Consultation des employés de la SCHL

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

PUBLIC CONSULTATION ON HOUSING RENOVATION PROGRAMS: SUMMARY

In the summer of 2002, Canada Mortgage and Housing Corporation, in co-operation with the provinces and territories, undertook a public consultation on the future of the federal government's housing renovation programs. The consultation involved discussions with Canadians on their views on the effectiveness of the renovation programs and their ideas on how the programs could be improved.

This document provides a summary of the input received from over 150 national, provincial, territorial and local stakeholder groups and individuals, including urban and rural municipalities and regional municipalities, First Nation provincial associations and Tribal and Band Councils, Métis and Innu groups, off-reserve Aboriginal associations, native inspection services, organizations representing non-profit and co-operative housing groups, seniors, transition homes, independent living centres, the homeless, persons with disabilities, occupational therapists, landlords, tenants, builders, and real estate agents, as well as advisory committees, housing partnerships, program beneficiaries, private citizens, agents responsible for the delivery of the renovation programs, and federal and provincial departments and agencies.

Ottawa: Canada Mortgage and Housing Corporation, December 2002. (Renovation Consultation Report)
57 pages

Note: Aussi disponible en français sous le titre : Consultation publique sur les programmes de rénovation : rapport sommaire

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

RENOVATION AND INSPECTION

RENTAL, ROOMING HOUSE AND NON-RESIDENTIAL CONVERSION COMPONENTS OF THE RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP PHASE I)

This project's objective is to evaluate the rental, rooming house and nonresidential conversion components of the Residential Rehabilitation Assistance Program to assess the rationale for and impacts of these program components from 1995 to 2000 inclusive.

CMHC Project Officer : *Connie J Wilson* ***CIDN*** : 27850500
Division : Audit and Program Evaluation Services ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RESIDENTIAL REHABILITATION ASSISTANCE PROGRAM (RRAP) PHASE II

The purpose of this project is to conduct an evaluation of the Homeowner and Persons with disabilities components of the Residential Rehabilitation Assistance Program (RRAP) Phase II.

CMHC Project Officer : *Eva Berringer* ***CIDN*** : 27850501
Division : Audit and Program Evaluation Services ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

UNDERSTANDING THE MOTIVATIONS OF HOMEOWNERS TO CONVERT THEIR BUNGALOWS IN QUEBEC CITY SUBURBS

This research will study the motivations that bring homeowners in Quebec City suburbs to convert their bungalows. The objectives of this research are to clarify the decision-making process associated with the home conversion projects so as to subsequently develop a theoretical conceptual model apt to describe household behaviour.

CMHC Project Officer : *Pascal Yvan Pelletier* ***CIDN*** : 24370211
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RENTAL HOUSING

HOUSING STABILITY INDICATORS AND IMPACTS

This research initiative will survey between 700 and 1,000 renter households in Greater Vancouver to begin to develop a better understanding of the overall level of housing stability/instability that exists among renter households.

CMHC Project Officer : *John E Engeland* ***CIDN*** : 25250212
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

NON-PAIEMENT DE LOYER ET LA SANTÉ DU SECTEUR LOCATIF AU QUÉBEC

Every year, the Régie du logement du Québec (Quebec Rental Board) receives some 70,000 cases, the vast majority of which involve the non-payment of rents by tenants. This situation means that landlords sustain losses of income that may be substantial but whose significance remains to be determined. This study is primarily aimed at measuring the significance of the phenomenon of the non-payment of rents in Quebec, its spatial distribution and its economic impact on the rental housing sector. The approach used rests mainly on a systematic analysis of the information contained in the computerized central file of the decisions delivered by the commissioners of the Régie du logement. The study covers a sample of 1,610 decisions rendered during the period from 1998 to 2000 for recovery-termination, recoveries other and abandonment. The 24 areas considered in the study correspond to the administrative delimitation of the agency's regional offices and cover all of Quebec. The sampling error is 3.92%.

Prepared by François Des Rosiers. CMHC Project Officer: Charles Fortin. Ottawa: Canada Mortgage and Housing Corporation, 2003. (CMHC External Research Program Report) 224 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

ONLINE GUIDE AND SEMINAR FOR RESIDENTIAL RENTAL PROPERTY INVESTORS

The objective of this project is to produce a guide useful to current and potential small residential rental property investors. It will address common questions such as how to obtain financing and tenants, leasing considerations, tax implications of renting, liability and property insurance, and various property management issues. The information in the guide will be used to produce future training material. It is anticipated that providing the information needed by potential investors in rental properties will facilitate their decision to invest, and positively impact the supply of rental housing.

CMHC Project Officer : *Tan M Crombie*
CIDN : 30740200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

REPAIR NEEDS ASSESSMENT OF RENTAL HOUSING IN THE CITY OF MISSISSAUGA

The purpose of this project is to carry out a study to examine the state of repair needs of rental buildings in Mississauga.

CMHC Project Officer : *Greg J Goy*
CIDN : 25240600
Division : Market Analysis Centre
STATUS : Ongoing
AVAILABILITY : Product is not yet available

STRATEGIES TO PRESERVE THE EXISTING RENTAL HOUSING STOCK IN GREATER VANCOUVER

The purpose of this study is to identify and consider a variety of tools that could be used to preserve the existing rental housing stock, and determine which of them would have the most potential for preserving the rental housing stock in Greater Vancouver.

CMHC Project Officer : *Tan M Crombie*
CIDN : 25250214
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

RENTAL HOUSING

YOUR GUIDE TO RENTING A HOME

This project's objective was to undertake research and produce content for an online residential rental guide. This guide provides comprehensive advice to tenants, landlords and rental property managers regarding rights, responsibilities and best practices. It includes checklists, worksheets, and sample forms and letters, and appropriate information for each province and territory. It also provides links to other web sites and contact information.

STATUS : Completed Report

AVAILABILITY : Product is available on the CMHC web site

RESIDENTIAL DEVELOPMENT

ASSISTING THE CITY OF STRATFORD TO IMPLEMENT THE FUSED GRID CONCEPT

The purpose of this project is to assist the City of Stratford in assessing the benefits of using the Fused Grid planning concept. This assessment will be done in the following steps:

1. Alternative plans will be drawn for the area of the newly annexed lands.
2. The plans will be analyzed for the following quantitative attributes: a) Length of streets; b) Total land area allocated to streets; c) Developable land area; d) Total open space; e) Traffic impact.
3. The plans will also be analyzed for qualitative attributes such as connectivity, walkability, safety, tranquility, and delight. For these qualitative attributes measurable indicators will be applied to evaluate performance.
4. The plans will be evaluated for their impact on municipal capital expenditures and operation and maintenance expenditures with regard to infrastructure elements that are installed and maintained by the city and elements that are installed by the developer but maintained by the city.

Following the presentation of the results of these analyses to the City, the planning committee and council will select one alternative which will be adapted as the official secondary plan for the annexed lands.

CMHC Project Officer : *Fanis Grammenos*

CIDN : N/A

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL

The study will address how Land Use Density (LUD) stipulations can impact and/or interplay with the various other system components of community plan-making, e.g. open space, schools, retail, etc. The project will provide an electronic template or guideline for a web based density visualization methodology by which individuals, groups, community associations, planning design professionals and institutions might engage in constructive dialogue in regards the selection of appropriate built forms for various densities in various planning situations.

CMHC Project Officer : *Mark Holzman*

CIDN : 19980200

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

LEVIES, FEES, CHARGES AND TAXES ON NEW HOUSING: 2002

This research identified, tabulated and compared the separate and cumulative costs of the various development charges, levies fees and other charges for various housing forms and tenure. The study encompassed 30 municipalities including those examined in a similar 1997 CMHC study. The research also identified the changes that have occurred with regard to these charges in the intervening period and assessed the burden these charges represent on new housing prices and on new rental property. The study found that these charges vary widely among municipalities and range from 5.2% to 19.7% of the house price and, correspondingly, from 7.6% to 21.2% of the development costs of rental property. In absolute terms, the range of total charges was from $8,662 to $48,327 for detached houses and from $5,170 to 22,280 for rental units. The comparison with the 1997 results show that total charges increased slightly from 13.5% to 13.7% of the house price.

Prepared by Greg Lampert. Ottawa: Canada Mortgage and Housing Corporation, 2003 (Housing Affordability and Finance Series) 165 pages

NOTE 1: Aussi disponible en français sous le titre : Impôts, droits, frais et taxes sur les logements neufs 2002

NOTE 2: No. 115 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site

STATUS : New Completed Report *Order number: 63184* and Research Highlight

AVAILABILITY : CMHC Information Products

RESIDENTIAL DEVELOPMENT IN COASTAL COMMUNITIES: ADDRESSING CLIMATE CHANGE THROUGH SUSTAINABLE COASTAL PLANNING

The Beaubassin coastal area of southeastern New Brunswick has a long coastal development history. It has become one of the premier places to live and play in New Brunswick. In recent years, a number of storm surges have impacted dramatically on people's coastal homes, cottages and properties. Scientists have determined that sea-level rise is occurring due to climate change and the impacts are being felt all along the coasts of not only New Brunswick but all of Canada. This project looks at the issue of sea-level rise and coastal residential development.

The study reviews residential development patterns and explores unsustainable land use practices of coastal communities. It looks at ways in which property owners are currently adapting to sea-level rise, storm surges and coastal flooding. The project recommends ways in which both communities and property owners can adapt to sea-level rise and storm surges in a sustainable way.

Prepared by Paul Jordan, Research Associate, Rural and Small Town Programme, Mount Allison University. CMHC Project Officer: Brian Eames. Ottawa: Canada Mortgage and Housing Corporation, 2002 (CMHC External Research Program Report) 38 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

RESIDENTIAL QUADRANTS: A NEW MODEL FOR SUSTAINABLE SUBURBS

This project's purpose is to: 1. Answer the question: would developers and municipalities be interested in building the residential quadrant design concept? 2. Assess the level of acceptability and attractiveness of developers and municipal authorities towards the concept and its various components; and 3. Perform a comparative analysis of the proposed concept, and conventional and new urbanist suburbs to assess how different street patterns affect cost, livability and consumption of land and resources. The project involves the development of a survey and a presentation both of which will be used to gauge the responses of participants in the subdivision development process. The results of this survey will be used to suggest ways in which the quadrant concept may be modified or refined to meet well founded concerns.

RESIDENTIAL DEVELOPMENT

CMHC Project Officer : *Fanis Grammenos* **CIDN** : 25250202
Division : External Research Program **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

STREET PATTERN DESIGN - A COMPARATIVE ANALYSIS OF SITE PLANS

Streets form an integral part of a residential district and affect the cost of development as well as the quality of a neighbourhood. Planners and developers continually seek new ways in which development costs can be reduced and quality can be maintained or increased. The objective of this research is to create an alternative site plan for a community in Surrey BC using the Fused Grid concept derived from the Residential Street Pattern Design research work. The alternative will be used to compare the improvements in infrastructure efficiency, housing affordability, environmental impacts and quality of residential environment using the current development plan as a benchmark. The outome of this research is to be used in presenting a case before developers and municipal planning officials to encourage the use of an alternative street pattern design that reduces costs and fosters housing affordability.

STATUS : Completed
AVAILABILITY : There will be no product for this project

STREET PATTERN DESIGN - ALTERNATIVE TREATMENTS FOR OPEN SPACES

This work responded to the frequently asked question: How would the open spaces in the Fused Grid quadrant be treated? The question is raised on the basis of concerns about maintenance ease and pedestrian friendliness. To answer this question a set of six detailed designs of the open spaces were developed that vary in the degree of embellishment and number of features. Correspondingly, each represents a different level of maintenance and opportunity for active or passive enjoyment. These designs will form part of the current presentation to developers and municipalities to illustrate the potential treatments of open spaces and their maintenance implications.

STATUS : Completed
AVAILABILITY : There will be no product for this project

SENIORS

DETERMINING THE IMPLICATIONS OF THE AGING OF THE CANADIAN POPULATION FOR HOUSING AND COMMUNITIES

The objective of this project is to examine the specific implications of the aging of the Canadian population for housing and communities. The research will be based on existing data and literature, new practical information from experts and key informants in communities, and case studies of communities that have already reached the proportions of seniors that Canada is expected to have over the next 30 years. The emphasis will be on identifying the challenges and opportunities for planning, designing and managing communities (i.e. cities, small towns and suburbs) with increasing older populations. While the project will deal with a range of issues, the main focus will be on urban form and housing. Other related issues, such as transportation, will have a secondary focus.

CMHC Project Officer : *Luis Rodriguez* **CIDN** : 27420200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF TRAINING MODULES AND CURRICULUM ON HOUSING FOR SENIORS AND PEOPLE WITH DISABILITIES FOR THE ARCHITECTURAL PROFESSION AND EDUCATIONAL INSTITUTIONS WITH CONSTRUCTION-RELATED PROGRAMS

The overall objectives of this project will encompass raising the professional awareness of new opportunities and defining continuing professional education and development tools and formats for architects, architectural technologists, and other building and design professionals. The project will proceed in the following phases:

1) Consultation & dialogue with interested organizations representing architects, faculties of architecture, schools & colleges and other educational institutions with construction related curricula ;
2) Identification of potential partnerships with these stakeholders;
3) Development of presentation materials and supporting documentation;
4) Identification and selection of presenters/implementation partners & identification of the mediums for learning; and
5) Development of a promotional plan for delivery of the learning opportunities.

The objective is to identify the most effective techniques for the development and delivery of the seniors seminar content and information most appropriate to these professional and technical audiences.

CMHC Project Officer : *Jim Zamprelli*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 26780200, 2684 0200

STATUS : Ongoing

EVALUATION OF OPTIMAL BATH GRAB BAR PLACEMENT FOR SENIORS: FINAL REPORT

The purpose of the proposed study was to evaluate the patterns of use as well as the perceived usefulness and perceived safety of five different configurations of bathtub grab bars for community-living seniors. Current bathing activities, fall history, socio-demographic characteristics, balance measures as well as details about the home bathing environment were recorded for 103 participants. Participants also evaluated five different configurations of bathtub grab bars to get in/out and sit down/get up from a standard bathtub. The five configurations evaluated corresponded to the standards published by the Canadian Standards Association, the US Uniform Accessibility Standards, a modification of the Ontario Building code, a "common configuration" and a composite configuration. A series of recommendations and suggestions for future research are made based on the data from the study.

Prepared by: Heidi Sveistrup ... et al. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2002. (CMHC External Research Program Report) 75 pages

Note: No. 03-110 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : Completed Research Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

HOME SELECTION GUIDE FOR THE 55+ MARKET

The objective is to produce a user-friendly guide document for use by Canadian housing consumers who are 55 years of age or older. The guide will be designed to help them assess their own housing situation; examine the types of solutions that can meet their needs and preferences; and identify the types of housing choices that are best for them.

CMHC Project Officer : *Luis Rodriguez*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 25360200

STATUS : Ongoing

INTERGENERATIONAL LIVING ARRANGEMENTS IN THE SUBURBS OF QUÉBEC CITY

This research project addresses intergenerational living arrangements in suburban accessory apartments. Accessory apartments are defined as self-contained housing units attached to, or built within, a single-family house. Occupants may share the entrance, backyard and parking area of the house (Leimwand and Despres, 1999: 3-4). The research pursues two objectives. The first involves documenting the family social dynamics that come into play when such a housing option is used. The second is to identify the implications of municipal zoning by-laws for the availability of this type of housing option.

CMHC Project Officer : *Luis Rodriguez*

CIDN : 25250209

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

LEGAL FRAMEWORK FOR SUPPORTIVE HOUSING

This project will review legislation applying to supportive housing for seniors and explore options for reform. The focus will be on legislation in British Columbia. The report resulting from the research should be useful to individuals and organizations involved in the development of supportive housing as well as policy makers.

CMHC Project Officer : *Luis Rodriguez*

CIDN : 25250213

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

LIFE LEASE HOUSING IN CANADA: A PRELIMINARY EXPLORATION OF SOME CONSUMER PROTECTION ISSUES

This 70 page research report describes life lease housing and how it operates in Canada; discusses the regulatory perspectives, policies, and plans of the five provinces (Ontario, Manitoba, Saskatchewan, Alberta and British Columbia) where life lease housing is currently available; describes the views of some development consultants about consumer protection issues; and identifies consumer protection issues that are of interest to governments and consumers and suggests how these might be addressed in a legislative framework. The discussions in the report are based on surveys of sponsors, development consultants, and the governments of provinces where life lease housing is currently active.

Prepared by Lumina Services Inc. Principal Investigator: Kate Mancer. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2003 (CMHC External Program Research Report) 70 pages

Note 1: Aussi disponible en français sous le titre : La location viagère au Canada : étude préliminaire de certains enjeux relatifs à la protection des consommateurs

Note 2: No. 03-113 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre

LIFE LEASE OWNERSHIP BY THE ELDERLY OF SUITES WITH CONTINUING CARE SERVICES

The objective of this research is to gather and document the views and preferences of prospective elderly residents for two distinct types of accommodation models. One model being a combination of life leases and support services in a home like environment, and the other a traditional long term care facility. The analysis will be done both before and after occupancy.

CMHC Project Officer : *Luis Rodriguez* ***CIDN*** : 24370201
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SEMINARS ON SENIORS' HOUSING FOR THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS

This project's objective is to develop and undertake delivery of seminars on seniors housing for professionals in the Canadian residential and home care sectors. The project was developed to disseminate the results of CMHC's research, programs and other relevant information concerning seniors housing. This project entails eight separate modules on different aspects of seniors housing. By mid year 2003 some 35 seminars/presentations were delivered at over 20 events. Evaluation results indicate a very high degree of satisfaction with the seminars and participants indicated they have used or plan to use the information gained at these events. The seminars project will continue in 2003-04 with a focus on the health and home care industry, architects and home builders. New audiences will also be sought, e.g. seniors organizations.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 23820200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Seminar/training is available

VILLAGEOIS DE LAFONTAINE HOUSING PROJECT FOR RETIREES = LE VILLAGEOIS DE LAFONTAINE PROJET DE LOGEMENTS POUR PERSONNES À LA RETRAITE

The development of a housing project for retirees began in the fall of 1998 under the direction of the Club de l'âge d'or and its partner CALDEC, a non-profit community economic development corporation. The Club set up a housing committee, which became a non-profit corporation and adopted the name "Le Villageois de Lafontaine".

This report documents the objective of this organization to develop a three-part housing project for retirees, consisting of:

- 30 units intended for retirees;
- 10-20 units for semi-autonomous persons; and
- a community centre integrated with the residential components, which provides the residents and the public with various services.

The organization hopes to serve on a priority basis the French-speaking population in the Township of Tilly, in Simcoe County, in north-central Ontario. The aim is to put a stop to the exodus of young people and retirees. Its plans call for accommodation for the elderly and employment for younger residents. Le Villageois wishes to be innovative in the area of affordable housing by offering a life lease. This report outlines the plans of the organization and its success to date.

Prepared by Le Club de l'âge d'or de Lafontaine, Le Villageois de Lafontaine and CALDECH. Final report as part of the Homegrown Solutions Project. Ottawa: Canada Mortgage and Housing Corporation, 2002. 41 pages

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre

SEARCH FOR MORAL MONEY: USING SELF-DIRECTED RRSP'S TO FINANCE SOCIAL HOUSING = À LA RECHERCHE D'UN FINANCEMENT ÉTHIQUE : UTILISER LES REER AUTOGÉRÉS POUR FINANCER LE LOGEMENT SOCIAL

This report examines the opportunity and feasibility of using self-directed RRSP investments to assist in financing development of affordable housing by non-profit housing groups.

Two options are explored and discussed. The first option considered using money in a self-directed RRSP to buy shares in a small business corporation that is created to develop and invest in affordable housing. The second option is using a self-directed RRSP to invest in a mortgage fund, which in turn can be used to provide mortgage financing for a social housing project. Both options require the investor to have a self-administered RRSP, and a flexible trustee willing to make the investment in the housing project.

This paper discusses how providers can use RRSP's and outlines some of the challenges facing a group that wants to access RRSP funds. The review of opportunities has identified some serious regulatory issues -- which while not insurmountable require a sophisticated institution to assemble and manage the investment funds. This study is not a guide or a 'how-to' manual. Rather, the intention is to outline the pitfalls and challenges facing a housing provider that wants to use self-directed RRSP's to finance social housing.

Prepared by Pareval Non-Profit Residential Corporation. Submitted to Homegrown Solutions. Ottawa: Canada Mortgage and Housing Corporation, 2002. 64 pages

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

SHELTER ENHANCEMENT PROGRAM EVALUATION = ÉVALUATION DU PROGRAMME D'AMÉLORATION DES MAISONS D'HÉBERGEMENT

The Shelter Enhancement Program (SEP) was initiated in 1995/96 with funding from the Federal Family Violence Initiative (FVI). The objective of the SEP is to assist in repairing and improving existing shelters for women and children in areas such as security, access for persons with disabilities, and improvements in child play areas. SEP also assists in the acquisition or construction of new shelters and second stage housing where needed.

SEP provides interest-free, fully forgivable loans to sponsors of first-stage shelters and second-stage housing for women and their children experiencing family violence. Sponsors who are eligible include non-profit organizations and Indian Band Councils. In December 1999, additional funding for SEP from the National Homelessness Initiative (NHI) was announced for the four years 1999/00 to 2002/03, and the scope of the program was expanded to include youth who are victims of family violence.

An evaluation of SEP was undertaken in 2001 and this report addresses the impacts of this program for Canadian family violence shelters. A separate report on the youth component of the SEP examines the youth shelters funded in the two years 1999/00 and 2000/01. The evaluation addressed four key questions: Have SEP expenditures improved shelter conditions and had positive impacts for shelter clients? Is there a continuing need for a program to fund mandatory repairs and enhancements of shelters (security, access for persons with disabilities, etc.)? What impact have SEP expenditures had on the need for shelters and shelter utilization? Is there a continuing need for a program to fund additional shelter units?

Submitted to Audit & Evaluation Services, Canada Mortgage and Housing Corporation by SPR Associates Inc. Ottawa: CMHC, 2002. 81 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

SHELTER ENHANCEMENT PROGRAM EVALUATION - YOUTH COMPONENT = ÉVALUATION DU PROGRAMME D'AMÉLORATION DES MAISONS D'HÉBERGEMENT - VOLET JEUNESSE

The evaluation of the Youth Component of SEP addresses the same questions as were considered in the SEP evaluation of family violence shelters. The Youth Component of the SEP Evaluation also attempts to estimate what percentage of youth shelter clients seek emergency housing because of family violence and examines the linkages between women's family violence shelters and youth shelters. It also considers the different sources of funding for these youth shelters, including fund-raising and partnering issues.

This evaluation of the youth component of SEP is based on only two years of SEP funding to-date for youth shelters which is the mid-term in the four years of SEP funding under the NHI. A total of 15 youth shelter organizations have received SEP funding, four of these for new shelter facilities and eleven for repairs of existing shelter facilities. Each of the youth shelters funded is unique in some respects including the client groups served and the services provided. Two are located in First Nations and the rest are located in metropolitan areas. The small number of youth shelters funded to-date and their variability make it difficult to generalize about the impacts of SEP funding at this time. Therefore, the objective of this evaluation was to provide an overview of the youth shelters funded and illustrate the impacts of SEP funding on the shelters and their programs for their clients.

Submitted to Audit & Evaluation Services, Canada Mortgage and Housing Corporation by SPR Associates Inc.
Ottawa: CMHC, 2002. 54 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

STRATEGIES FOR DEALING WITH "STRANDED" SOCIAL HOUSING PROJECTS/UNITS

Increasing numbers of public and social housing projects are located in areas of rural depopulation which are losing their service infrastructures. This results in housing projects being "stranded" in communities which are becoming service-poor. The people in the "stranded" projects are often seniors who must face decreasing access to necessary social and health services/facilities. This project would entail an assessment of the scope of the problem and include case studies of communities/social housing managers who have experimented with "best practices" in dealing with the challenge.

CMHC Project Officer : *Anna Lenk*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26570200
STATUS : Ongoing
NEW

CO-SPONSORSHIP OF CITIES PLUS INTEGRATED DESIGN WORKSHOP (CHARRETTE) PUBLICATION

The purpose of this project is to document the input, process and outputs of the Integrated Community Design Workshop held as part of the development of a 100 year plan for the Greater Vancouver Regional District (GVRD) for submission to the Sustainable Urban Systems Design Competition sponsored by the International Gas Union. The Vancouver submission, citiesPlus, was the eventual winner over entries received from eight other cities around the world. The design workshops were held to explore long-term plans for specific neighbourhood types as well as to understand the integration of other elements of the plan at the neighbourhood level. The resulting report and CMHC Research Highlight will provide another example in a series of community design and green building charrettes in which CMHC has participated to develop resources and examples for others to use in their sustainable community planning activities.

CMHC Project Officer : *Norm Connolly* — ***CIDN*** : 28200200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to analyze demographic, housing, transportation and energy data and to develop a consumer-oriented information product comparing the impact of various housing choice scenarios, each with different community planning patterns. Users of this web based product will be able to select among five Canadian cities. In each city, five typical neighbourhood development patterns and locations within the urban context will be described, highlighting issues such as private vehicle use, access to daily destinations and availability of private space.

CMHC Project Officer : *Susan Fisher* — ***CIDN*** : 22800200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

IT'S ALL ABOUT HOUSING: SUSTAINABLE, PLANNING PRACTICE AND HOUSING FORM IN THE OAK RIDGES MORAINE

The objective of this project is to examine the legacy of planning policy in the Oak Ridges Moraine (ORM) region. The scope of the research centres on the impact and role of housing on growth and institutional conflict in the Moraine region. The analysis will provide a guide for potential planning actions.

CMHC Project Officer : *Steve R Jacques* — ***CIDN*** : 25250205

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

LANDSCAPE DESIGN AND MAINTENANCE FOR CANADIAN HOMES

The purpose is to develop an updated advisory document on landscape design, construction and maintenance for Canadian homes. CMHC`s last advisory document of this nature, entitled Landscape Architectural Design and Maintenance, was published in 1982. While it offers many practical tips and tools which should be emulated, the update will be more oriented toward a consumer audience, place more emphasis on sustainability and build on recent CMHC research in this area. The document will be completed in 2003 and will be of interest to consumers, landscape architects and the landscape industry.

CMHC Project Officer : *Susan Fisher*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 22290200
STATUS : Ongoing

ON THE LIVING EDGE: YOUR HANDBOOK FOR WATERFRONT LIVING

Learn how to protect your investment and have more time to enjoy your waterfront setting. The authors share their personal experiences of living by water in B.C. in this user-friendly handbook. It includes informative tips, advice, helpful B.C. references, illustrations and stories to assist with the unique challenges of waterfront living. This handbook for waterfront living includes the following topics:

- shoreline erosion
- protecting your water quality
- tips for purchasers
- docks
- recreation and boating
- native plants on the shoreline
- septic and water systems
- building by water
- caring for yards and gardens
- co-existing with wildlife

"On the Living Edge" has been written for both permanent shoreline residents and seasonal cottagers along all types of shorelines: marine and freshwater, urban and rural. This includes property bordering on the ocean, an estuary, lake, reservoir, or river. It also includes properties which contain a stream, pond, canal, wetland, or drainage ditch.

British Columbia Edition. Prepared by Sarah Kipp and Clive Callaway. CMHC Project Officer: Susan Fisher. Vancouver: Federation of British Columbia Naturalists, 2002. 142 pages.

STATUS : Completed Report
AVAILABILITY : Living by Water Project at shorelines@jetstream.net, 250-832-7405 or 604-737-3057, www.livingbywater.ca

PROTOTYPE INTERNET TOOL FOR NEGOTIATED URBAN DESIGN

The purpose of the study was to create a prototype Negotiated Urban Design (NUD) Tool that provides an interactive forum for stakeholder engagement in Planning-Design-Development projects. Part 1 consists of an examination of various methods of density specification, analysis of the relationship between achieved density and specified density and a survey of practitioners' opinions on various methods of density specification. Part 2 dealt with the development of the Negotiated Urban Design (NUD) Tool. The tool is simulated on a CD-ROM. It was beyond the scope of this research to create a fully functioning tool. It is intended that the tool would ultimately be web based for easy access and to promote stakeholder interactivity and engagement in the Planning-Design-Development process. The tool is primarily image based and seeks to determine and advise on participant preferences to streetscape and form with density specifications secondary.

Prepared by William T. Perks, Faculty of Environmental Design, University of Calgary and Terry Brooke, Brooke Associates. Website design: Rosita Kwan and Ed Reddy. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 2003. (External Research Program Research Report). 1 volume (67 pages) + CD-ROM

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

RESIDENTIAL INTENSIFICATION BEST PRACTICES FROM ACROSS CANADA

The contractor will document residential intensification best practices from across Canada. The best practices will include built projects as well as municipal initiatives that encourage residential intensification. The study will examine a range of intensification types including brownfield redevelopment, infill, secondary suites and parking lot redevelopment. Developers, occupants and municipalities will be interviewed.

CMHC Project Officer : *Susan Fisher*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25590200
STATUS : Ongoing

SETTING PRIORITIES FOR MORE SUSTAINABLE COMMUNITIES: A GUIDE

Every day, municipal councils, businesses and individuals in Canadian cities, towns, and villages make a variety of conscious and implicit choices with environmental impacts, small or large. These include individual and community-scale purchases, construction and renovation, waste disposal, driving patterns, types of appliances and equipment used, etc.

Over time, whole communities move either toward or away from becoming more "sustainable". That is, they determine whether they will pass on to future generations natural and built environments in equal or measurably better condition than the ones they inherited.

To stay on track in shaping better environments, communities need to set explicit priorities based on combined consideration of evidence, values, and resources. Strategies to set priorities include:

- Tackle the biggest problems first.
- Align priorities with dominant community values.
- Choose the most effective solutions.
- Pick the lowest-cost solutions.
- Find the quickest solutions.

The most productive and successful priorities are likely to be those combining the above strategies in a single package. Setting day-to-day priorities is also much easier if communities are also guided by a shared vision of where they would like to be in five, ten, or twenty-five years.

This Guide offers help with how to make the best case for "environmental" decisions when many other competing possibilities are tugging at policy-makers. It also suggests how to select which kinds of decisions are likely to pay off most for the environment, based on the best available evidence.

Prepared by The Bayswater Consulting Group Inc. CMHC Project Officer: Douglas Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2003 (External Research Program Research Report) 124 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

TESTING CONSUMER RECEPTIVITY TO SUSTAINABLE COMMUNITY DESIGN FOR A DEMONSTRATION-BUILD SITE IN OKOTOKS, ALBERTA

This project tested consumer receptivity to the alternative features of a 144-acre demonstration project that adopts sustainable community principles and planning criteria. The Research Highlight describes the sustainable community design demonstration in Okotoks, Alberta and summarizes the responses of consumers to the design features.

STATUS : Completed Research Highlight

AVAILABILITY : CMHC Information Products and on the CMHC web site

WOMEN AND HOUSING

MEASURING THE IMPACTS OF SECOND STAGE HOUSING ON HIGH RISK WOMEN WHO HAVE BEEN IN CONFLICT WITH THE LAW

This research, under CMHC's External Research Program, will examine program outcomes related to Pathways, a nine unit, second stage housing program administered by the Elizabeth Fry Society in Vancouver. Pathways opened in May 2000 and provides transitional (second stage) stabilization and re-integration housing to women who have been referred primarily from semi-custodial or treatment settings. The study will compare the outcomes of individuals who have attended Pathways with a comparison group who are matched on a number of broad characteristics but who have not attended the program.

CMHC Project Officer : *Anna Lenk*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : N/A

STATUS : Ongoing

NEW

YOUTH AND HOUSING

INSERTION RÉSIDENTIELLE DES JEUNES MIGRANTS AU QUÉBEC

This research report examines the housing integration of youth who migrate from city to city or region to region within Quebec. It identifies not only the problems encountered by young people, but also the strategies and support available to help them get settled in housing. The study of residential integration in a migration context is particularly justified because youth who leave their parents' homes to live elsewhere find themselves distanced from those people most likely to assist and support them during a period of life now marked by low income and difficulty in settling into the labour market. It is also relevant due to the number of youth who migrate from one administrative region to another. Affecting close to one in two young people, this experience is now part of the process of attaining adulthood, of which residential integration is a cornerstone.

Based on a study of texts, semi-structured interviews carried out in 1997 and, in particular, the results of a survey of 5,518 respondents between 18 and 34 years old conducted in the winter of 1998-1999, this analysis provides a profile of Quebec youth migration, and describes the circumstances of the departure and settlement into new housing and the priority given to housing in decisions, and projects regarding future mobility.

Prepared by Marc Molgat with the collaboration of Frédéric Deschenaux and Nathalie St-Laurent. CMHC Project Officers: Fran Harding and Leanne Elliott. Ottawa: Canada Mortgage and Housing Corporation, 2003 (CMHC External Program Research Report) 107 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

CMHC RESEARCH REPORT LISTINGS

To provide quick and comprehensive access to CMHC research published on a given topic, the Canadian Housing Information Centre compiles comprehensive listings of housing research produced over a number of years on certain topics. Topics chosen are those for which there is ongoing client interest and/or for which CMHC has published considerable research. To obtain an electronic, faxed or mailed copy of any of the lists below, contact the Canadian Housing Information Centre at: 1-800-668-2642 or e-mail us at: chic@cmhc.gc.ca

Listings available at this time include:

- Acoustics
- Affordable Housing
- Airtightness
- Basements, Foundations and Crawlspaces
- Concrete
- Condominiums
- Cooperative Housing
- Environmental Site Assement and Contaminated Lands
- Heating and Ventilation
- Homeless
- Housing and Women
- Housing Export Opportunities
- Housing for Older Canadians
- Housing for Persons with Disabilities
- Indoor Air Pollution
- Infrastructure
- Lead
- Log Home Construction
- Manufactured Housing
- Moisture Problems
- Mortgages and Housing Finance
- Native Housing
- Northern Housing
- Rental Housing
- Residential Construction Waste
- Residential Renovation
- Self Help Housing
- Social Housing
- Straw Bale Housing
- Sustainable Development and Healthy Housing
- Water Conservation, Reuse and Management

Fact sheets on common housing questions, issues and problems.

These documents are available in HTML and Adobe Acrobat format (pdf) on the CMHC web site at: http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/abhose_060.cfm

Print copies can be obained by calling 1-800-668-2642

Order no.	Series no.	Title
62027	CE 1	**Measuring Humidity in Your Home** Is there condensation on the windows? Are there wet stains on the walls or ceilings? Is there static or sparks whenever you touch something? Diagnose humidity problems in your home. Aussi disponible en français sous le titre : Mesurer l'humidité dans votre maison
62028	CE 2	**Combustion Gases in Your Home** Do you have a gas or oil fired furnace, boiler or water heater? What about a woodstove or fireplace? Take the necessary steps to keep combustion gases out of your home. Aussi disponible en français sous le titre : Les gaz de combustion dans votre maison
62029	CE 3	**Asbestos** What is asbestos? Why is it so useful? What problems can asbestos cause and what options does the homeowner have in dealing with them? Aussi disponible en français sous le titre : Amiante
62031	CE 5A	**Understanding Window Terminology** This factsheet offers helpful guidance on buying the right type of window for your home. Terminology commonly used in the window indsutry is also presented. Aussi disponible en français sous le titre : Comprendre la terminologie des fenêtres
62032	CE 6	**Urea-Formaldehyde Foam Insulation (UFFI)** What is UFFI? Why was it banned? Should you be concerned about UFFI? How do you know if your home has UFFI? Aussi disponible en français sous le titre : Mousse isolante d'urée-formaldéhyde (MIUF)
60515	CE 7	**After the Flood** Protect your health and prevent further damage to your home by following this step-by-step guide to restoring your home after a flood. Aussi disponible en français sous le titre : Après une inondation

Order no.	Series no.	Title
60516	CE 8	**Fighting Mold: The Homeowner's Guide** Mold can cause allergies or respiratory disease. Learn how to identify and eliminate mold from your home. Aussi disponible en français sous le titre : Combattre la moisissure -- Guide pour les propriétaires-occupants
62043	CE 9	**Maintaining Your HRV** For a clean and healthy living environment, review the seven steps to maintaining the Heat Recovery Ventilator (HRV). Aussi disponible en français sous le titre : L'entretien du VRC
60339	CE 10	**Wood Heat Safety in an Emergency** Whether you often use a wood stove or a fireplace, or are coping with an emergency loss of electricity, learn how to safely use wood to heat your home. Aussi disponible en français sous le titre : Le chauffage au bois en toute sécurité lors d'une situation d'urgence
60356	CE 11	**When You Reoccupy Your House After a Prolonged Winter Power Outage** A series of practical tips to protect your home in case you are required to evacuate for more than 24 hours because of power failure. Aussi disponible en français sous le titre : À votre retour à la maison après une longue interruption de courant en hiver
60360	CE 12	**Tips for Post-storm Tree Care** Practical pruning advice to restore the health and shape of trees damaged by ice or wind storms. Aussi disponible en français sous le titre : Le soin des arbres après la tempête
62034	CE 13	**Attic Venting, Attic Moisture, and Ice Dams** How do you deal with a leak in the ceiling? How should an attic be properly vented? How do you eliminate ice dams? This fact sheet will answer these and other attic related questions. Issued also in French under the title: Aussi disponible en français sous le titre : Ventilation du vide sous toit, humidité dans le vide sous toit et formation de barrières de glace

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62035	CE 14	**Carpet Streaking** Does your carpet have permanent dark stains near baseboards, air registers or under doorways? Find out what causes carpet streaking and what you can do about it. Aussi disponible en français sous le titre : Taches en traînée sur les moquettes
62036	CE 15	**Removing Ice on Roofs** Whether you have a sloped or flat roof, learn techniques that will help you deal with extensive roof icing or ice dam problems. Aussi disponible en français sous le titre : L'enlèvement de la glace sur les toitures
62037	CE 17	**The Importance of Bathroom and Kitchen Fans** Choosing the proper kitchen and bathroom fans is important for improving indoor air quality and maintaining ideal humidity levels. Aussi disponible en français sous le titre : Importance des ventilateurs de cuisine et de salle de bains
62038	CE 18	**How to Read a Material Safety Data Sheet (MSDS)** Reading and understanding the Material Safety Data Sheet (MSDS) provides product information about product hazards and the necessary safety precautions to follow when using it. Aussi disponible en français sous le titre : Comment déchiffrer une fiche technique sur la sécurité des substances (FTSS)
62039	CE 19	**Insulating Your House** Choose the right insulation to reduce the amount of energy you use and to make your home more comfortable. Aussi disponible en français sous le titre : L'isolation de votre maison
62040	CE 21	**Log Homes: Frequently Asked Questions** A list of questions and answers concerning the unique design and building considerations for log homes. Aussi disponible en français sous le titre : Foire aux questions - maisons en rondins
62041	CE 22	**Your Furnace Filter** To reduce exposure to airborne particles, choose the furnace filter that best suits your needs. Aussi disponible en français sous le titre : Le filtre de votre générateur d'air chaud

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62042	CE 23	**Water-Saving Tips for Your Lawn and Garden** Often water is applied inefficiently, resulting in significant waste due to over watering, evaporation or run-off. Here are some general watering tips to avoid such waste. Aussi disponible en français sous le titre : Comment entretenir vos pelouses et jardins en économisant l'eau
60417	CE 24	**Backup Power for Your Home** The top ten tips in choosing the appropriate backup system to provide electricity to your home in the event of a prolonged power failure. Aussi disponible en français sous le titre : Alimentation de secours pour votre maison
62046	CE 25	**Carbon Monoxyde** A list of questions and answers dealing with keeping Carbon Monoxide out of your home and to help you choose the right CO detector. Aussi disponible en français sous le titre : Le monoxyde de carbone
62277	CE 26a	**Hiring a Contractor** How do you find the "right" contractor for you? What should go in a contract? What are liens, holdbacks and completion certificates? Make sure you get what you want and pay for when hiring a contractor. Aussi disponible en français sous le titre : Le Choix d'un entrepreneur
62351	CE 26b	**Sample Renovation Contract** A detailed written contract between you and the contractor you hire is essential to any renovation or home repair project, no matter its size. Aussi disponible en français sous le titre : Modèle de contrat de rénovation
62045	CE 27	**Choosing a Dehumidifier** Air that is too damp can cause condensation on windows, water damage to materials, mold and even wood rot. Choose the right dehumidifier to regulate the humidity in your home. Aussi disponible en français sous le titre : Le Choix d'un déshumidificateur
	CE 28	**The Renovation Project (12 parts)**
		This series will assist you in making informed decisions before you renovate. Each easy-to-read fact sheet helps you ask the key questions, reviews the available options and discusses the consequences if certain aspects of the renovation are overlooked. Advance planning is the key to successful renovations. These fact sheets help you plan, assess, and avoid surprises. Achieve the results you want by doing your renovation right the first time.

Order no.	Series no.	Title
62246	CE 28a	**Assessing the Renovation Project** Before renovating, it's important to assess your home's current condition to determine if there are significant problems that you must deal with before or during the renovation project. Aussi disponible en français sous le titre : Évaluation du projet de rénovation
62248	CE 28b	**Renovating your Basement - Structural Issues and Soil Conditions** Renovating a basement can add value and extra living space to a home. Fixing foundation problems before renovating is essential to preserve the durability and structure of the house. Aussi disponible en français sous le titre : Rénovation du sous-sol - Aspects structuraux et conditions du sol
62250	CE 28c	**Renovating Your Basement - Moisture Problems** Is there condensation on the basement windows? Are there white chalky stains on the foundation? Do the carpets smell musty? Creating a clean, dry and healthy living space is a critical first step. Aussi disponible en français sous le titre : Rénovation du sous-sol - Problèmes d'humidité
62252	CE 28d	**Renovating Your Kitchen** The kitchen is often the most used room in the house and kitchen renovations typically have the highest financial payback. Conduct a pre-renovation inspection and prioritize the most desirable features for your new kitchen. Aussi disponible en français sous le titre : Rénovation de la cuisine
62254	CE 28e	**Renovating Your Bathroom** Bathroom renovations offer the second highest financial payback rate and are one of the most common home improvement projects. Use this fact sheet to check for problems before you renovate. Aussi disponible en français sous le titre : Rénovation de la salle de bains
62256	CE 28f	**Window and Door Renovations** Do you want more natural light in your living area? Are you concerned about security? Before repairing or replacing windows and doors, consider all of the factors outlined in this fact sheet. Aussi disponible en français sous le titre : Nouvelles portes et fenêtres

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62258	CE 28g	**Repairing or Replacing Roof Finishes** Regular maintenance and periodic roof inspections will identify problems before they cause costly damage to your home. Learn about the key factors that will determine whether you should repair or replace your roof. Aussi disponible en français sous le titre : Réparation ou remplacement de la couverture
62260	CE 28h	**Repairing or Replacing Exterior Wall Materials** Exterior finish materials must prevent rain and snow from penetrating the building and causing moisture damage. Repairing or replacing exterior wall finishes will protect and preserve the durability and structure of the home. Aussi disponible en français sous le titre : Réparation ou remplacement du revêtement des murs extérieurs
62262	CE 28i	**Energy Efficient Upgrade - Mechanical Systems** Upgrading the heating, cooling and ventilation (HVAC) equipment is the best way to create a healthy, comfortable and less expensive home to operate. Before altering these, it is important to understand how the overall performance of the house will be affected. Aussi disponible en français sous le titre : Améliorations éconergétiques - installations mécaniques
62264	CE 28j	**Energy Efficient Upgrade - The Building Envelope** The envelope, or outer layer, of your house separates living space from the outdoor elements. Improving it can result in a better insulated, more airtight home that is easier to heat. Aussi disponible en français sous le titre : Améliorer l'efficacité énergétique - L'enveloppe du bâtiment
62266	CE 28k	**Assessing the Comfort and Safety of Mechanical Systems** The heating, ventilating and air conditioning (HVAC) systems are a vital part of your home. Ensure that your mechanical systems are operating safely and efficiently. Aussi disponible en français sous le titre : Évaluation de vos installations mécaniques - confort et sécurité
62268	CE 28L	**A New Addition** Before building an addition, clearly identify the features you need and inspect the current structure and mechanical systems to be sure they can support the new addition. Aussi disponible en français sous le titre : Une nouvelle annexe

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62044	CE 29	**Should you get your Heating Ducts Cleaned?** Should you get your heating ducts cleaned? Will clean ducts result in improved air quality? When is duct cleaning most appropriate? This fact sheet separates fact from fiction. Aussi disponible en français sous le titre : Doit-on faire nettoyer les conduits de chauffage?
63322	CE 30	**Water Damage, Mold and House Insurance** You've had water damage in your house due to a burst pipe, a roof leak, or a heavy summer storm. You hope that your insurance will cover the damage. What to do? Aussi disponible en français sous le titre : Moisissure, dommages causés par l'eau et assurance habitation
62226	CE 31	**Understanding and Dealing with Interactions Between Trees, Sensitive Clay Soils and Foundations** Is the size, type or siting of a tree affecting your foundation? Understanding the interactions between trees, soils and the foundation can help you avoid foundation shifting, cracks and other damage. Aussi disponible en français sous le titre : Comprendre l'interaction des arbres, du sol d'argile sensible et des fondations et agir en conséquence
62288	CE 33	**CMHC Garbage Bag Airflow Test** This simple test uses an ordinary garbage bag to help you estimate airflow from your furnace registers, bathroom exhaust fan or clothes dryer exhaust. Aussi disponible en français sous le titre : Essai de mesure du débit d'air à l'aide d'un sac à ordures
62795	CE 34	**Your Septic System** A primer on the components, operation and proper maintenance of an in-ground septic tank and system. Aussi disponible en français sous le titre : Votre installation d'assainissement
62839	CE 35	**Hiring a Home Inspector** One of the best ways to understand about a home's condition, habitability and safety is to hire a professional home inspector. Aussi disponible en français sous le titre : Le Choix d'un inspecteur en bâtiment
62341	CE 36	**The Condominium Owners' Guide to Mold** Special advice for identifying and removing mold in a condo, and solving the problems that cause it. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des copropriétaires

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62935	CE 39	**Buying a Toilet** Advice and tips on what to look for when buying a toilet. Aussi disponible en français sous le titre : L'achat de toilettes
62953	CE 41A	**UV Water Treatment** Describes the ultra-violet light water treatment process, and the pros and cons of using such a system. Aussi disponible en français sous le titre : Traitement de l'eau aux rayons ultraviolets (UV)
62898	CE 41B	**Water Distillers** Everything you ever wanted to know about water distillers from how they work to how to install and maintain them. Aussi disponible en français sous le titre : La distillation de l'eau
62896	CE41C	**Water Filters** Consumer series of household water treatment options. Water filters are an inexpensive method of additional water treatment. Some filters can remove certain contaminants such as lead. Aussi disponible en français sous le titre : Filtres à eau
62946	CE 41D	**Water Softeners** Find out how a water softener works and obtain information on whether you should consider installing one. Aussi disponible en français sous le titre : Les adoucisseurs d'eau
62962	CE 41E	**Reverse Osmosis Water Treatment** Describes the reverse osmosis water treatment process, and provides the pros and cons of using such a system. Aussi disponible en français sous le titre : Filtration de l'eau par osmose inverse
62966	CE 42	**Canada's Construction System** The purpose of this document is to foster understanding of the elements of the system of construction and operation of buildings and houses in Canada. Aussi disponible en français sous le titre : Système de construction canadien
63134	CE 44	**Painting: Walls, Ceilings and Floors** This factsheet provides general information on: selecting paints, e.g. latex (water based) or alkyd (oil based); types of paint and paint finishes, e.g. low or high sheen, sealer, primer, melamine; estimating quantity of paint required; preparing for painting; and painting tips. Aussi disponible en français sous le titre : La peinture : murs, plafonds et planchers.

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Order no.	Series no.	Title
63144	CE 45	**Flooring Choices** A quick summary of the advantages, considerations, installation, maintenance, and costs to think about when choosing resilient, laminate, and wood flooring, as well as carpet and ceramic tile. Aussi disponible en français sous le titre : Les revêtements de sol
63218	CE47	**Home Maintenance Schedule** This factsheet provides a listing of the regular home maintenance tasks which should be done at various times throughout the year to protect the condition of your house. Aussi disponible en français sous le titre : Calendrier d'entretien de votre maison
63227	CE48	**Replacing Your Furnace** This fact sheetprovides information for consumers who are replacing their existing furnace with a new one. It deals with fuel choice, furnace selection, and furnace sizing. Aussi disponible en français sous le titre : Le remplacement d'un générateur de chaleur
63235	CE 49	**Getting Your House Ready to Sell** Tips for homeowners who wish to get their house ready to sell. Aussi disponible en français sous le titre : Ce qu'il faut faire avant de mettre votre maison en vente

ABOUT YOUR HOUSE - **NORTH SERIES**

VOTRE MAISON - **DOSSIER DU NORD**

The North About Your House series is a series specifically designed around day to day northern solutions as well as innovative northern models of building practices which work under cold climate conditions. In this series you will find examples of how to use structural panels in the high arctic, means to cleanse wastewater in the North as well as demonstrated ways of constructing a roof which can withstand northern conditions and how to choose a foundation system which will work in any of the northern communities.

Order no.	Series no.	Title
62303	North Series 1	Building with Structural Panels -- Repulse Bay
62304	Dossier du Nord	Maison à panneaux isolants de construction à Repulse Bay
62295	North Series 2	On-site Wastewater Reclamation Systems for the North
62297	Dossier du Nord 2	Installations de recyclage sur place des eaux usées dans le nord
62329	North Series 3	Snowshoe Inn, Fort Providence Co-generation Model
62330	Dossier du Nord 3	Modèle de cogénération du Snowshoe Inn, Fort Providence
62298	North Series 4	Residential Foundation Systems for Permafrost Regions
62299	Dossier du Nord 4	Fondations pour les bâtiments résidentiels construits sur le pergélisol
62154	North Series 5	Eagle Lake Healthy House
62155	Dossier du Nord 5	La maison saine d'Eagle Lake
62313	North Series 6	Arctic Hot Roof Design
62314	Dossier du Nord 6	Conception de toits chauds pour climat arctique
63050	North Series 8	How to Prevent Plumbing and Heating Vent Stack Freeze-up
63051	Dossier du Nord 8	Prévenir le gel des colonnes de ventilation de plomberie et des conduits d'évacuation de l'appareil de chauffage

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63280	03-121	Ventilation Systems for Multi-Unit Residential Buildings: Performance Requirements and Alternative Approaches
63243	03-119	Reduction of Air Intake Contamination in High-Rise Residential Buildings
63257	03-118	Investigation of a Ground-Source Heat Pump Retrofit to an Electrically Heated Multi-Family Building
63237	03-117	Influence of an Electronic Air Cleaner on Indoor Ozone
63225	03-116	Qualification of the Degree of Acoustic Comfort Provided by Multi-Family Buildings - Phase II
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63208	03-114	Technology Roadmap for Intelligent Buildings
63223	03-113	Dawson City Demonstration Monitoring Northern Ventilation
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63190	03-105	Penetration of Outdoor Particles Into a Residence
63186	03-104	Indoor Particulate and Floor Cleaning
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63172	03-101	Mandatory Home Inspections on Resale Homes in Ontario

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